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WAR DEPARTMENT TECHNICAL MANUAL

TM 11-4054

RADIO RECEIVERS

BC-779-A and B
BC-794-A and B
BC-1004-A, B, C, and D
and R-129/U

REPAIR INSTRUCTIONS

WAR DEPARTMENT · JULY 1946

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For explanation of distribution formula, see FM 21-6.

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SECTION I
DESCRIPTION

1. General

a. Radio Receivers BC–779–A and B, BC–794–A and B, BC–1004–A, B, C, and D, and R–129/U, as well as many Hammarlund commercial super pro receivers used by the Signal Corps, are functionally identical. The basic difference is that each model is designed for different frequency coverage. With a few minor exceptions given in detail in paragraphs 3 through 6, the schematic diagrams are identical with the exception of schematic reference numbers. These differ solely because of varying electrical values. The function and location of component parts on the various schematics remain identical. Overhaul, trouble-shooting, and repair procedures are identical for all the subject receivers and for their commercial super pro equivalents. (See table I.) The subject receivers use a conventional superheterodyne circuit and are designed for the reception of amplitude-modulated (a-m), audio, and continuous-wave (c-w) signals with either manual or automatic volume control (avc). These receivers use an external power supply and speaker. They are designed primarily for rack mounting in standard 19-inch relay racks but may be used as table models by putting them into Cabinet CH–104–A. (See fig. 1.)

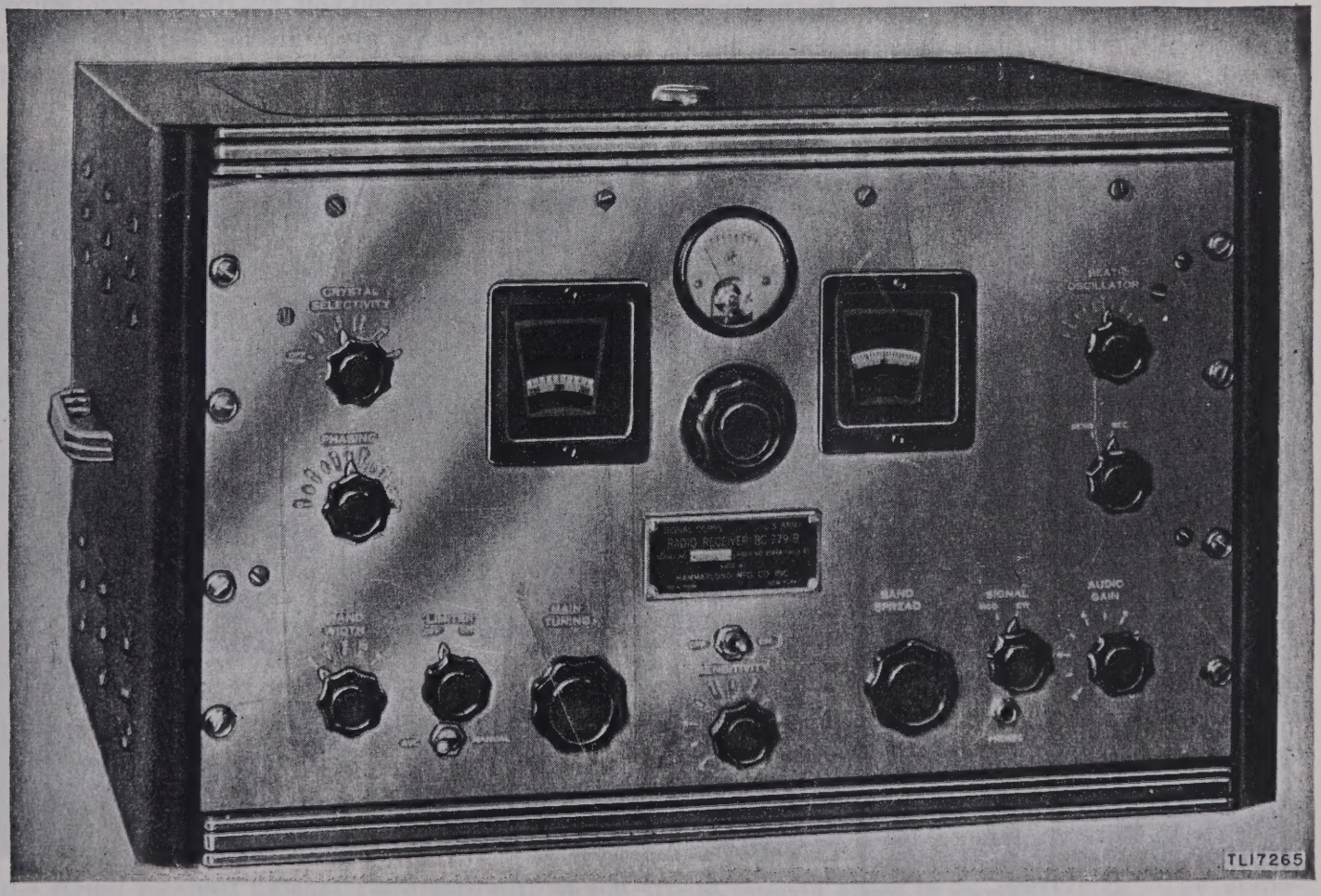

Figure 1. Radio Receiver BC–779–B in Cabinet CH–104–A.

b. Throughout this manual, when text material is equally applicable to any or all Radio Receivers BC–779–A and B, BC–794–A and B, BC–1004–A, B, C, and D, and R–129/U, the term *the receiver* or *the subject receiver* will be used. When a specific model is indicated, it will be referred to by number but without official nomenclature (for example, the BC–1004–B). When text material is not equally applicable, the receiver to which it applies will be identified. For

purposes of illustrating, only one receiver is used and the receiver is identified in this title of the illustration. It should be understood, however, that all receivers covered by this manual would appear identical to the illustration presented except for the nameplate.

c. Many various models of Hammarlund commercial super pro receivers were put into field use prior to the assignment of Signal Corps nomenclature to such receivers. The text of this manual is as equally applicable to some of these super pro receivers (SP–200 and SP–210 series) as to the subject receivers. For all receivers to which this manual is applicable, see table I. It indicates the relationship between super pro and Signal Corps nomenclature. Note that super pros of the SP–10 and SP–110 series use different electrical components and circuits and have characteristics different from receivers listed on table I, and for these reasons are not covered by this manual. For repair information on the super pro series SP–10 and SP–110, the repairman should see TM 11–310 and changes thereto.

Table I. Cross references for commercial and Signal Corps nomenclature

Hammarlund commercial nomenclature*	Equivalent Signal Corps nomenclature
SP–210–LX	BC–779–A
SP–200–LX	BC–779–B
SP–210–SX	BC–794–A
SP–200–SX	BC–794–B
SP–210–X	BC–1004–A and –B
SP–200–X	BC–1004–C and –D
None	R–129/U

* When an R appears in commercial nomenclature, such as in SPR, it indicates that the equipment is a rack model rather than a table model. For the purposes of this manual, all SP and SPR models can be considered identical.

d. An external power supply is required to operate the subject receivers for repair and testing purposes. The following power supplies are designed for use with the subject receivers.

(1) Power Supply Unit RA–84–B for a 105- to 125-volt, 50- to 60-cycle source.

(2) Power Supply Unit RA–74–C for a 95- to 130-volt, 190- to 260-volt, 25- to 60-cycle source.

(3) Power Supply Unit RA–94–A for a 115- or 230-volt, 50- to 60-cycle source. The average

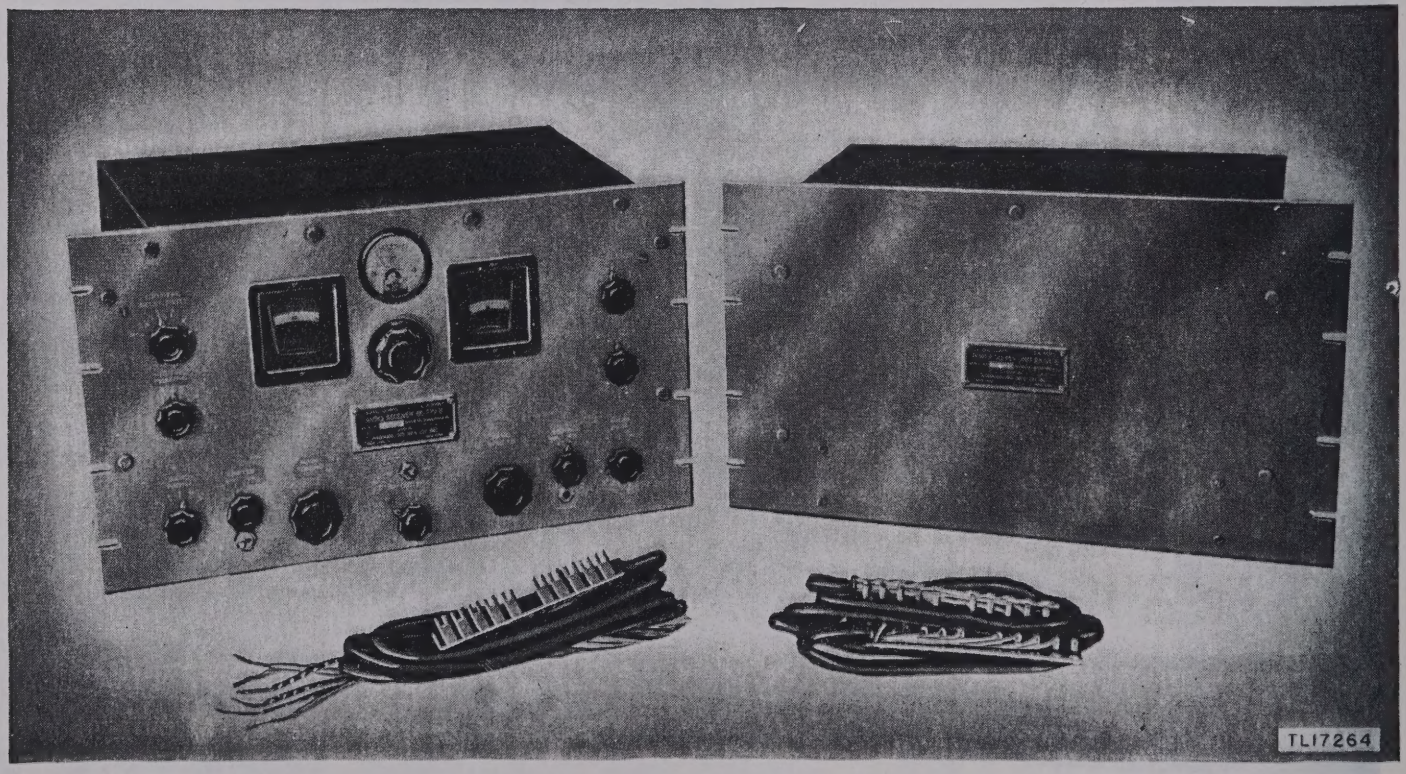

Figure 2. Radio Receiver BC–779–B with associated power supply.

power consumed is 180 watts. If a suitable power supply is not available, any receiver can be operated from a 6-volt storage battery, five 45-volt B batteries, and a 45-volt C battery. Figure 2 shows Radio Receiver BC–779–B with associated power supply.

e. The receiver requires the following current and voltages:

Circuit	Volts	Amperes
Heater	6	6.25
Plate	225	0.117
Screen	90	0.0045
C bias	45	0.010

f. The total power output is approximately 10 watts. Undistorted power output is about 3 watts with greater distortion as the output is increased. There are marked terminals along the rear of the chassis for two output circuits.

(1) The 600-ohm terminals, marked SPKR, are for use with loudspeaker, recorder, 600-ohm audio transmission line, or whenever high power is needed.

(2) The other terminals, marked PHONES, are connected in parallel with phone jack J1 on the front panel, and provide reduced power for headphones, see figure 4.

2. Over-all System Function (fig. 3)

a. General. The receiver uses a superheterodyne or double detection type of circuit for reception of modulated and continuous-wave a-m signals. The over-all system function may be understood by reference to figure 3.

b. Radio-Frequency Amplifier and High-Frequency Oscillator. The incoming signal is transmitted from the antenna through two radio-frequency (r-f) amplifier stages V1 and V2 to the first detector stage. The high-frequency (h-f) oscillator V4 operates at a frequency exactly 465 kilocycles higher than that of the incoming signal being amplified by the second r-f amplifier V2. This mixing process results in the generation of a very complex waveform in the first detector plate circuit.

c. First Detector. The desired component of the signal received by the first detector from the r-f amplifier, and the oscillator, having a frequency of 465 kilocycles, is selected, amplified, and impressed upon the grid of the first intermediate-frequency (i-f) stage by the first detector which uses Tube JAN VT–87 (6L7) pentagrid mixer V3.

d. Intermediate-Frequency Amplifier. The intermediate-frequency amplifier has stages V5 (first i.f.), V6 (second i.f.), and V7 (third i.f.), and three coupling transformers, T1, T2, and T3 respectively. The stages use pentode amplifier tubes of the remote cut-off or supercontrol type. The crystal filter impedes voltage from first detector V3 to first i-f amplifier V5. Its selectivity can be varied in definite steps by the CRYSTAL SELECTIVITY switch controlled from the front panel. In addition, its selectivity characteristic can be greatly sharpened on one side or the other by adjusting the PHASING capacitor. When the CRYSTAL SELECTIVITY switch is set at OFF, the crystal is short-circuited, and signal voltages present in the secondary of the first detector plate coil are impressed directly on the control grid of first amplifier tube V5.

e. Second Detector. The signal from third i-f stage V7 is transmitted to second detector V8, a twin diode tube. It can be modified at this point by noise limiter V9, which is a class B twin triode, controlled by a switch on the front panel. Limiter action is for the purpose of reducing line noises carried by the i-f signal.

f. Beat-Frequency Oscillator. Beat-frequency oscillator (bfo) V10 provides an r-f signal of approximately 465 kilocycles. This signal, when introduced into the input circuit of the second detector, mixes with the i-f signal being delivered by third i-f amplifier tube V7. The mixture of these two similar frequencies results in a beat, or a difference frequency, in the output of the second detector. By adjusting the beat oscillator, the pitch of this frequency can be controlled.

g. Automatic-Volume Control and S Meter System. The automatic-volume-control (a-v-c) circuit is coupled to third i-f stage V7. Amplified i-f voltage present in the plate circuit of a-v-c amplifier tube V11 is impressed on the a-v-c rectifier tube V12 by the transformer T6. When the AVC-MANUAL switch is thrown to AVC, the S meter is put into operation. The meter reading varies as the receiver is tuned through a signal, being highest at exact resonance.

h. Audio-Frequency Amplifier. The audio-frequency amplifier has three stages, using one triode and three pentodes. Triode V13 is used in the first audio-frequency (a-f) stage, one pentode V14 as the a-f driver (second a-f stage), and the other two, V15 and V16, are used in a push-pull arrangement in the a-f output (third a-f)

stage. The receivers have two output windings on the output transformer. A 600-ohm output is provided at terminal strip E3 for use when moderate or maximum power is required for the operation of a loudspeaker, recorder, or for a 600-ohm audio transmission line. An 8,000-ohm output is provided at terminal strip E3 for headphone use. For additional convenience, a phone jack has been installed on the front panel in the later issues of all models. The circuit is in parallel with the PHONES output terminals at terminal strip E3.

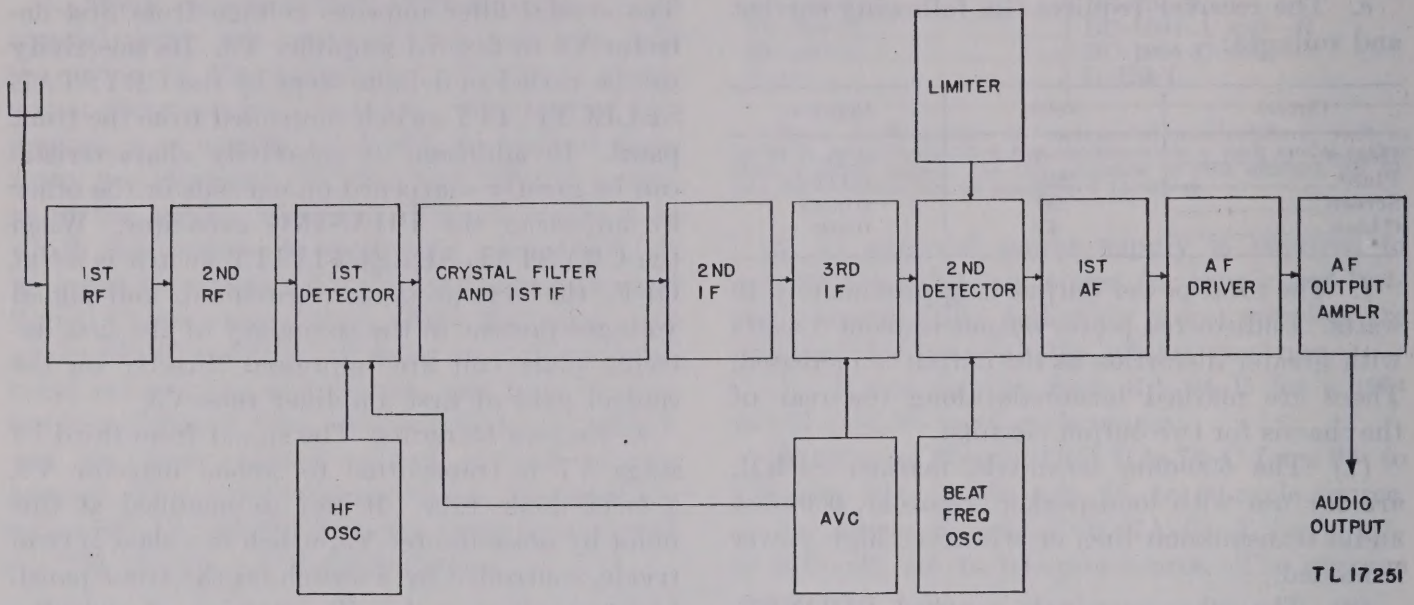

Figure 3. Radio Receiver BC–779–B, block diagram.

SECTION II
DIFFERENCES BETWEEN MODELS

3. Operational Differences

The only operational differences in the subject receivers is their operating frequencies. Many commercial super pro receivers can be identified only by the frequency coverage and dial calibration shown on their MAIN TUNING dial. The frequency coverage and dial calibration of each band (with BAND SPREAD dial set at 100) follows. If a commercial super pro has the same frequency coverage and dial calibration as a Signal Corps receiver listed here, the super pro can be considered identical to the Signal Corps model and this manual will be equally applicable for the super pro. The correct tie-up between super pros and Signal Corps model issue letters may be determined by referring to table I.

a. Radio Receivers BC–779–A and B.

Band	*Calibration*
100 kc–200 kc	2 kc per division
200 kc–400 kc	5 kc per division
2.5 mc–5.0 mc	50 kc per division
5.0 mc–10 mc	100 kc per division
10 mc–20 mc	100 kc per division

b. Radio Receivers BC–794–A and B.

Band	*Calibration*
1,250 kc–2500 kc	20 kc per division
2.5 mc–5 mc	50 kc per division
5.0 mc–10 mc	100 kc per division
10 mc–20 mc	100 kc per division
20 mc–40 mc	100 kc per division

c. Radio Receiver BC–1004–A, B, C, and D.

Band	*Calibration*
540 kc–1,160 kc	10 kc per division
1,160 kc–2500 kc	20 kc per division
2.5 mc–5.0 mc	50 kc per division
5.0 mc–10 mc	100 kc per division
10 mc–20 mc	100 kc per division

d. Radio Receiver R–129/U.

Band	*Calibration*
300 kc–540 kc	10 kc per division
540 kc–116 kc	10 kc per division
1,160 kc–2,500 kc	20 kc per division
2.5 mc–5.0 mc	50 kc per division
5.0 mc–10 mc	100 kc per division

4. Design Differences, Basic Receivers

To provide a closer tie-up with TM 11–866 and to avoid any confusion that might result in attempting to discuss all nine of the subject receivers at the same time, this text will consider Radio Receivers BC–779–B, BC–794–B, and BC–1004–C as the basic receivers and point out in complete detail the differences among these three basic receivers. Except when specifically mentioned in this text, all subject receivers of the same model number (for example, Radio Receiver BC–1004–A, B, C, or D) and their commercial equivalents are to be considered identical to their equivalent basic receiver. The differences in the basic Radio Receivers BC–779–B, BC–794–B, and BC–1004–C are:

a. A 0.25-mf bypass capacitor (C30) is across the 3-volt C-bias terminal of the BC–779–B. This capacitor is not present in BC–794–B nor in the BC–1004–C.

b. The plate supply for stages V1 and V2 is series fed in the BC–779–B and BC–1004–C. The plate supply is shunt fed in the BC–794–B through r-f chokes L35 and L36 and coupled through capacitors C57 and C58.

c. Two plate decoupling filters consisting of resistor and capacitor combinations R4–C6 and R8–C10 are present in the BC–779–B and BC–1004–C. These two filter combinations are not used in the BC–794–B.

d. Two series damping resistors R57 and R58, are used on the 540- to 1160-kc band of the BC–1004–C. These resistors are not present in the BC–779–B and BC–794–B.

e. The BC–794–B does not use a fixed series capacitor on the 20- to 40-mc band oscillator coil, stage V4. All other frequency bands of all the subject receivers use this series capacitor.

f. The BC–779–B used variable parallel padding capacitors, C87 and C86, on its 100- to 200-kc and 200- to 400-kc frequency bands. These two capacitors are not present on any other frequency bands.

5. Design Differences, Radio Receivers BC–1004–D and R–129/U, and Basic Receivers

a. Radio Receiver BC–1004–D. The basic receiver for this model is the BC–1004–C. The basic issue C has a tuning (S) meter which the D issue does not contain. This is their only difference.

b. Radio Receiver R–129/U. The basic receiver for this model is the BC–1004–C. In the R–129/U, 300- to 500-kc coil assemblies are used

in place of the 10- to 20-mc coil assemblies of the BC–1004–C. In addition, the band spread has been removed from this low-frequency band and the series padding capacitor (C79) has been changed in value.

6. Other Differences

a. In later issues of all models, potted type transformers and chokes with terminal boards in place of leads are used. Hermetically sealed bypass capacitors are now being used. Oil filled capacitors have replaced the electrolytics formerly used.

b. Any difference in electrical values, due solely to varying frequency coverages, may be readily seen by checking the parts lists in paragraphs 42 through 57, where such information is presented in tabular form.

SECTION III
INITIAL REPAIR PROCEDURES

Note. Before any repairs or adjustments are made all authorized Modification Work Orders should be applied. See FM 21–6 for list of applicable Modification Work Orders.

7. General

A step-by-step procedure for the complete overhaul and repair of the subject receivers by fourth and higher echelon repair personnel is presented in this manual. Strict adherence to the text will assure satisfactory repair and overhaul in the shortest possible time.

8. Tools, Test, and Cleaning Equipment

The equipment listed below is necessary for the repair of this receiver. All items listed, or found needed and not listed, must be in perfect working order.

Item	Description
1. Signal generator.	This should be an accurately calibrated instrument producing r-f signals (modulated 30 percent, 400 cps) the frequency range required is 100 kc to 20 mc. The generator should have an output up to 100,000 microvolts, and an output impedance of approximately 100 ohms.
2. Output meter.	The meter should respond to the modulation frequency of the signal generator, preferably 400 cps. The meter must have a resistance greater than 500 ohms. This may be part of item 7.
3. Crystal calibrator.	This equipment is required for testing dial calibration accuracy and should be adjustable for the following frequencies: 465 kc for i-f, 110-220 kc, 190-380 kc, 2.5-5 mc, 5-10 mc, 10-20 mc.
4. Spare radio set.	A spare receiver to be used in comparing quality.
5. A standard loudspeaker.	To be used in aligning and in listening during operational tests.
6. High-impedance headset.	For same purpose as the speaker.
7. Volt-ohm-milliammeter.	This equipment is necessary for metering resistances, voltages, etc.; it may also be used as an output meter, such as I–56–( ). (See item 2.)
8. Insulated screw driver.	Required for aligning and repairs. 9/64 inch wide and 0.025 inch thick at bit.
9. Cleaning material.	Solvent, Dry-cleaning.
10. Paint and varnish remover.	Signal Corps Stock No. 6G1801.
11. An assortment of brushes.	½ inch, 1 inch, and larger.
12. Clean, dry, compressed air.	For cleaning.
13. Assorted grades of sandpaper.	Fine grades—#0, #000 and medium rough #2.
14. Small flash or probing light.	
15. Paint.	For cover: wrinkle black enamel, class 541. For front panel; 1. Gray metal primer, class 101. 2. Lusterless gray, air drying or baking enamel, class 101.

9. Removal of Tubes and Pilot Lights (fig. 4)

a. Description. All plug-in parts in the receiver are exposed when the dust covers are removed and the chassis is uncovered. The plug-in parts are the tubes, pilot lights, and meter light, listed below:

Reference No.	Type	Function
V1	JAN–6K7 (VT–86)	1st r-f amplifier
V2	JAN–6K7 (VT–86)	2d r-f amplifier
V3	JAN–6L7 (VT–87)	1st detector (mixer)
V4	JAN–6J7 (VT–91)	h-f oscillator
V5	JAN–6K7 (VT–86)	1st i-f amplifier
V6	JAN–6SK7 (VT–117)	2d i-f amplifier
V7	JAN–6SK7 (VT–117)	3d i-f amplifier
V8	JAN–6H6 (VT–90)	2d detector
V9	JAN–6N7 (VT–96)	Noise limiter
V10	JAN–6SJ7 (VT–116)	B-f oscillator
V11	JAN–6SK7 (VT–117)	A-v-c amplifier
V12	JAN–6H6 (VT–90)	A-v-c rectifier
V13	JAN–6C5 (VT–65)	1st a-f amplifier
V14	JAN–6F6 (VT–66)	2d a-f amplifier (driver)
V15	JAN–6F6 (VT–66)	3d a-f amplifier (output)
V16	JAN–6F6 (VT–66)	3d a-f amplifier (output)
I1		Dial light
I2		Dial light
I3		Meter lamp

The dial lights (I1 and I2) are 6- to 8-v, 0.15-amp miniature screw base lights, and can be seen mounted in their sockets directly behind the tuning dials. The meter light (I3) is a 6- to 8-v, 0.15-amp miniature bayonet base type and is mounted into the S-meter. (See fig. 4 for placement of tubes.)

b. Removal. (1) *Tubes.* The tubes in this receiver are all unshielded and may be removed by easing from sockets after disconnecting the grid leads. A tightly set tube which cannot be lifted from top of chassis may be started by gently tapping the tube aligning plug from beneath the chassis with a padded mallet and a wooden peg narrower in diameter than the plug.

(2) *Lamps.* The dial lights may be removed by unscrewing bases from their sockets. The meter light is easily removed by prying the socket from the meter housing.

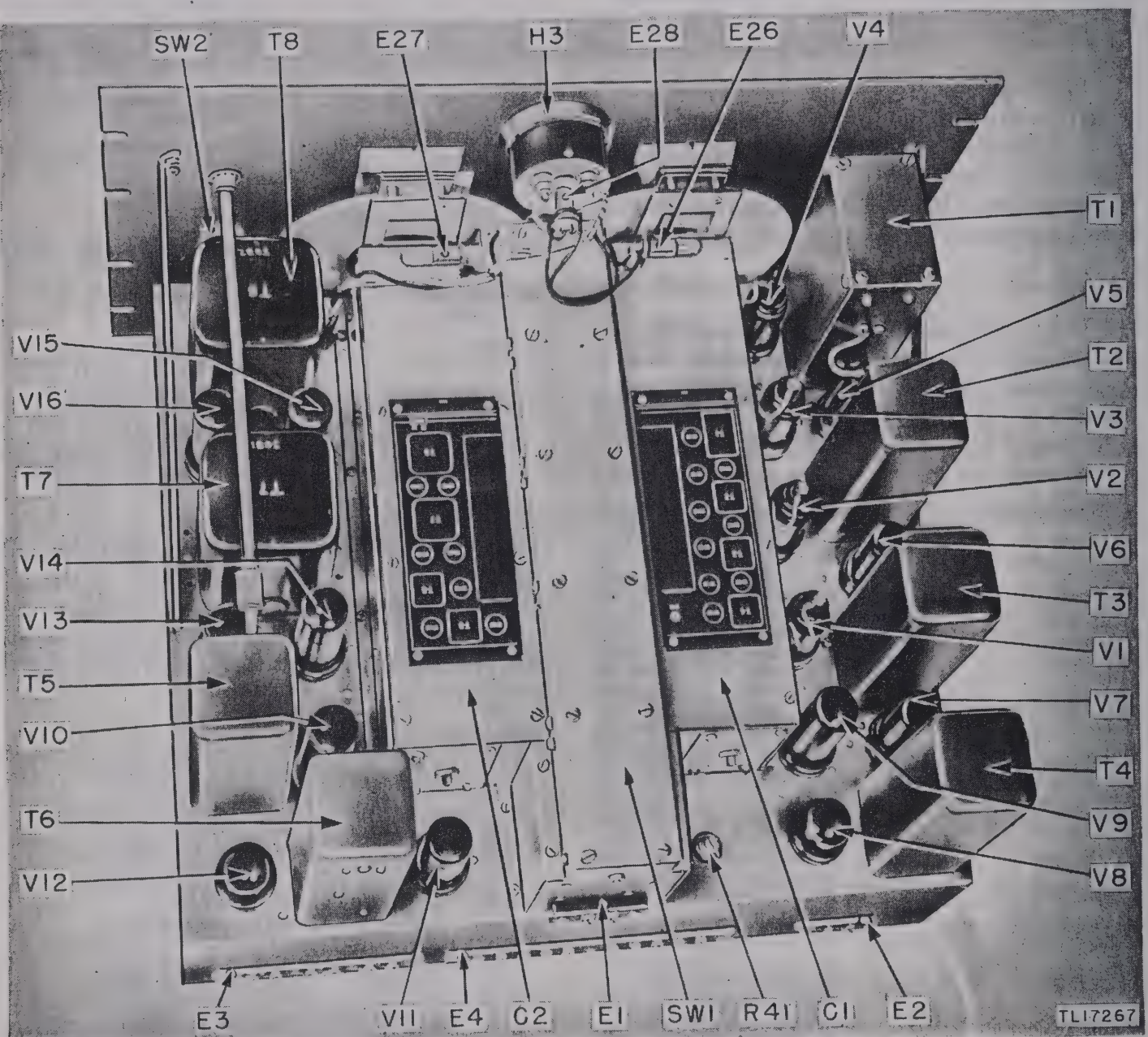

Figure 4. Top view of chassis.

10. Cleaning

a. Remove any foreign matter, such as dust, dirt, and corrosion on the panel, dust cover, and chassis. Do not use liquids before removal of dust cover exposing the chassis, as they may filter into the interior of the unit and cause damage to the integral parts. Be careful when removing the knurled thumbnuts that retain the dust cover. If knurled thumbnuts are corroded, they may be sufficiently weakened and may snap off if forced.

b. To remove the dust cover from the unit, turn the knurled thumbnuts that retain the cover in a counterclockwise direction to loosen, and lift the chassis from the unit.

c. Common instances, where the cleaning is simply the removal of ordinary dust, clean, dry, compressed air can be used. After removal of

the dust, wipe with a soft rag. Where the condition is a stubborn one, use a coarse rag or stiff brush to remove dirt from the unit. In severe instances where dirt (mud) is encountered, wash off the dirt with dry-cleaning solvent (SD). After washing, use a clean dry rag and wipe surface until thoroughly dry. Compressed air can be used to aid drying.

d. After the dust or dirt has been removed and corroded areas are discovered, apply dry-cleaning solvent (SD), using an appropriate size brush, to the affected areas. Allow the solvent to remain on the area long enough to penetrate the corrosion. Remove the solvent with a dry clean rag and sandpaper the affected area to expose clean metal. Medium, rough, or fine sandpaper should be used. Very severely affected areas should be treated by alternate application of solvent and abrasive.

Caution: Steel wool and emery must not be used. Fine particles of metal may enter the equipment and cause damage by grounding or shorting circuits.

Where it has been necessary to wash off dust or dirt to clean, the unit should be preheated at a temperature of 140°F for 1 to 2 hours to thoroughly dry out the unit. Switch and coil contacts should not be touched with abrasive and only a solvent should be used since the contacts are thinly plated and abrasives will remove the plating. Moisten a clean cloth with solvent and wipe the contacts clean. Dry with a clean cloth.

e. Carbon tetrachloride or dry-cleaning solvent (SD) should be used to remove all grease and oil deposits on the equipment.

f. To remove blistered paint or varnish from areas already coated, an application of paint and varnish remover, Signal Corps Stock No. 6G1801, should be used. If not effective, rub the spots with #0000 sandpaper. Do not attempt to remove moistureproofing and fungiproofing varnish from wire or cable. If moistureproofing and fungiproofing coating has been disturbed, touch up with moistureproofing and fungiproofing varnish.

g. After corrosion, paint, or plating has been removed, the bared portion should be touched up or replated in accordance with U. S. Army, Signal Corps Tentative Specification, 71–1523.

h. Remove salt spray with a clean rag moistened with clear water. Wipe the affected area until all indications of salt are removed. Dry with a clean cloth.

11. Inspecting

a. General. Test all moving parts for ease of motion. Binding and scraping may be eased by a light application of #0000 sandpaper. Corrosion or dirt will interfere with electrical continuity and mechanical efficiency by shorting or insulating circuits, or by jamming moving parts. Switches must work easily with no searching for contacts. The following parts must be examined and cleaned before operation of the receiver.

(1) Tube sockets.

(2) BAND WIDTH camshaft and plungers (fig. 5).

(3) Transformer parts (fig. 6).

(4) Crystal assembly contact points, shafts, and bearings.

(5) Switches, mountings, and shafts.

(6) Switch blades in tuning unit (fig. 7).

(7) Dial assembly, drive assembly shaft, and driving disks (fig. 7).

(8) Meter housing and meter movement.

(9) Tuning coil assemblies (fig. 8).

(10) Variable capacitors and trimmers.

(11) Lamp sockets.

(12) Phone jacks.

(13) Control shafts.

(14) Beat-frequency oscillator control shaft and couplings.

(15) Knurled cap nuts for fastening dust covers.

Resolder leads known to be loose or broken and replace all items that appear broken upon inspection.

b. Shock Damage. (1) *Dial gearing.* A heavy shock may cause the idler gear controlling the main dial mask to jump out of mesh. This will result in faulty operation of the dial mask, when the band switch knob is turned. This idler gear can be seen between the S-meter and the main dial escutcheon. With a long screw driver, carefully spring this idler gear back into line while slightly rocking the band switch knob back and forth and permit the gear teeth to engage. If the dial mask does not properly synchronize with the band switch dial, it can be turned by hand to the correct position while holding the idler gear out of mesh.

(2) *Front panel.* If the front panel is bent it will cause the main dial escutcheon to press heavily enough against the main dial guides to pinch them in on the dial mask. The mask is driven through gears by the band switch knob,

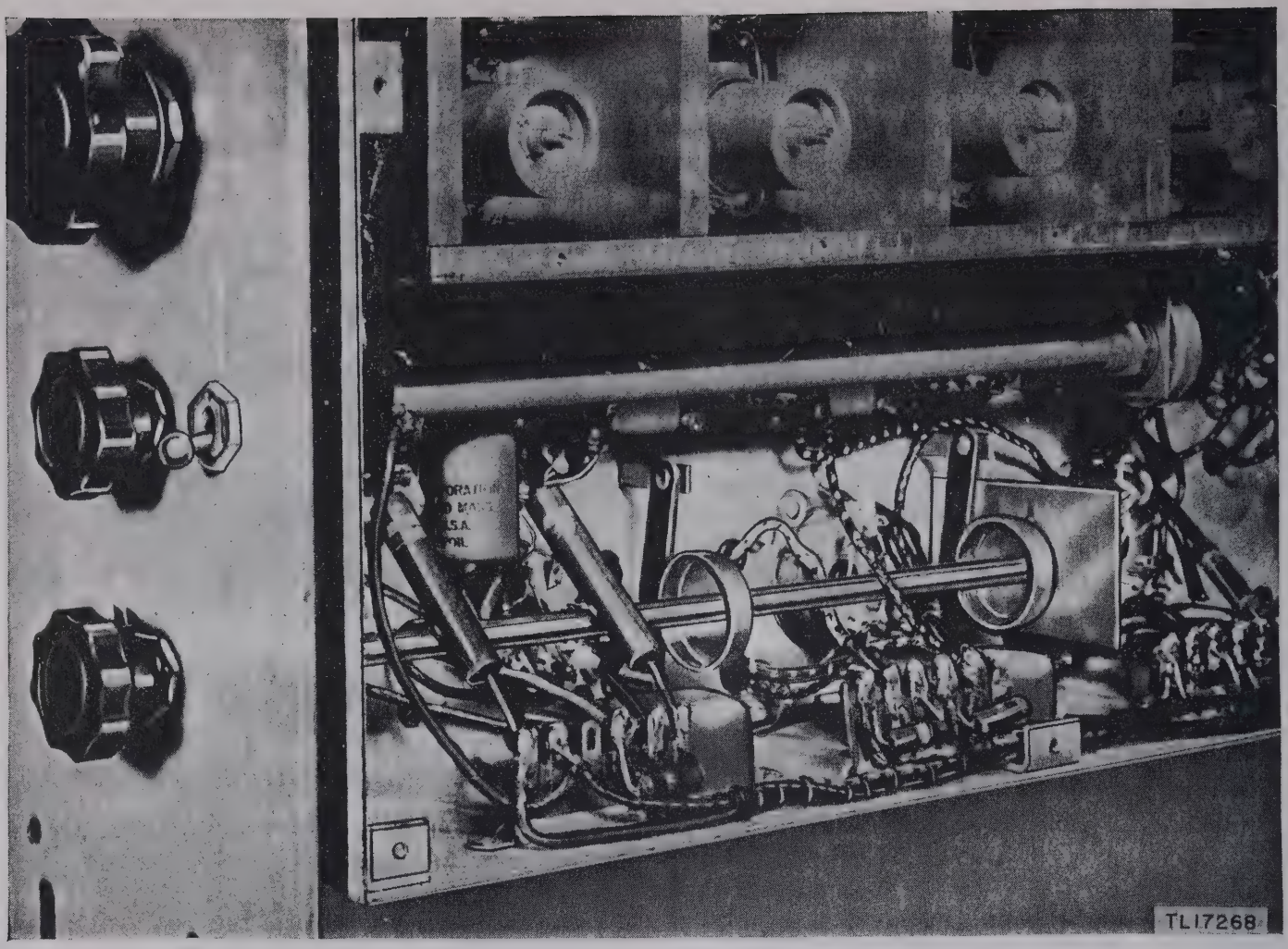

Figure 5. Band width camshaft and plunger arms.

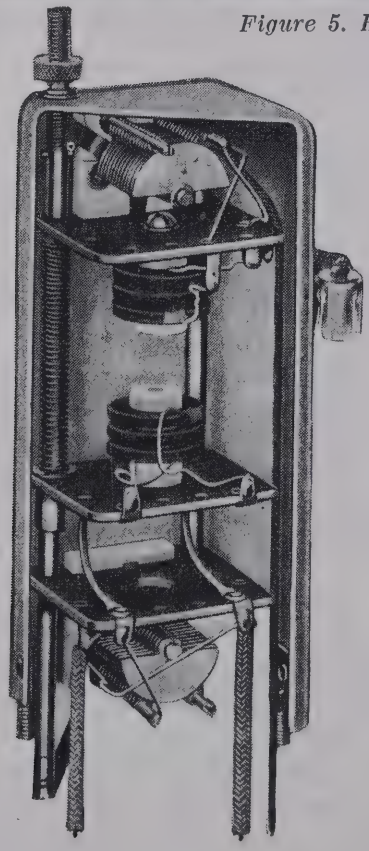

Figure 6. Cutaway view of i-f transformer.

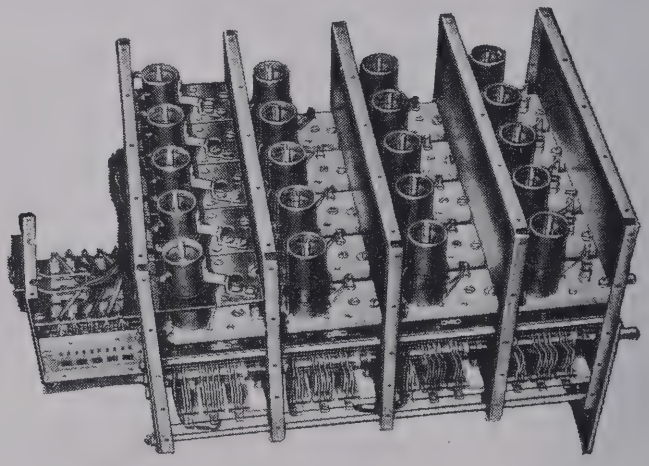

Figure 7. Tuning unit assembly.

and any extra friction on the mask will make the band switch difficult to turn. This condition can be relieved by springing the dial guide assembly back a sufficient amount to permit the mask to rotate freely.

(3) *Friction drive.* Remove the bottom cover plate from the receiver and make sure the two friction disks are tightly squeezing the edge of the dial. These disks are held on the friction

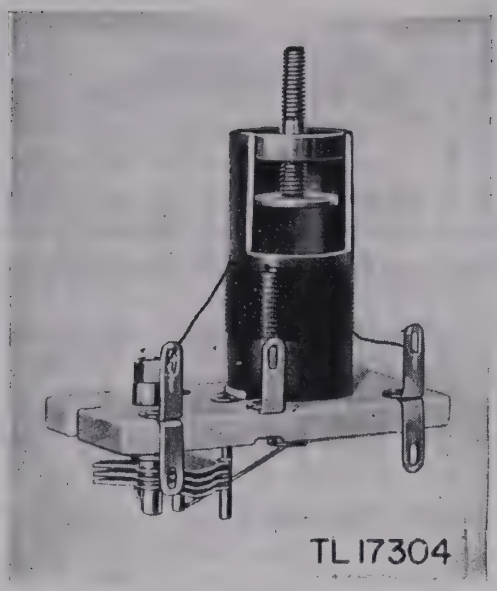

Figure 8. Cutaway view of tuning coil.

drive shaft by a hex nut which can be tightened with a wrench or pair of pliers. If a heavy shock has caused the dial to jump completely out from between the disks, the outer disk must be removed and replaced with the dial in its proper position. The washers must be replaced exactly as they were originally assembled.

12. Lubricating

To provide smooth motion in moving parts, lubricants are not recommended. Binding posts may be polished or cleaned. The plunger arms in the phasing adjustment, figure 5, may be eased with a light coat of petrolatum, U. S. Army 2–67A. This same procedure may be used on the plunger shafts in transformers T2, T3, and T4, see figure 4.

13. Cleaning, Inspecting, and Testing Tubes and Pilot Lights

All plug-in parts are listed and described in paragraph 9.

a. Testing. Plug-in parts in this unit include tubes, pilot lights, and a meter light. Tube values, operating conditions, and characteristics may be obtained from a standard tube catalog. The pilot lights can be tested with any 6- to 8-volt, 0.15-ampere power source.

b. Cleaning. The base pins of the tubes, the pilot lights, and meter light bases should be cleaned by swabbing with solvent. A light rub with crocus cloth is helpful for heavily corroded pins.

SECTION IV
PRELIMINARY TROUBLE-SHOOTING PROCEDURES

14. Preparing Receiver for Operating and Testing

a. General. At this point, the repairman is assumed to have familiarized himself with the preceding sections of this manual and to have followed the procedures outlined. A working knowledge of the functioning of the equipment has been gained. All removable parts have been removed, cleaned, and tested. The chassis, panel, and all attached parts have been cleaned and any noticeable defects corrected. The necessary tools and test equipment have been assembled and checked for accuracy. The receiver is now ready to be placed into operation. The repairman is ready to proceed with systematic preliminary testing, alignment, and final testing. Attention is especially called to the fact that this manual is not intended to be simply a trouble-shooting manual for a receiver that has developed trouble in the field and needs a quick repair job to put it back in satisfactory operating condition. However, when trouble is encountered, its cause should be immediately traced and corrected. This text has been prepared for fourth and higher echelons of Signal Corps repair organizations. Its purpose is to put equipment into depot stock piles for reissue as class A equipment. This purpose cannot be accomplished by merely repairing what is obviously wrong. To insure satisfactory results, it is necessary to follow completely the procedures and tests outlined from here on, even though the receiver may ap-

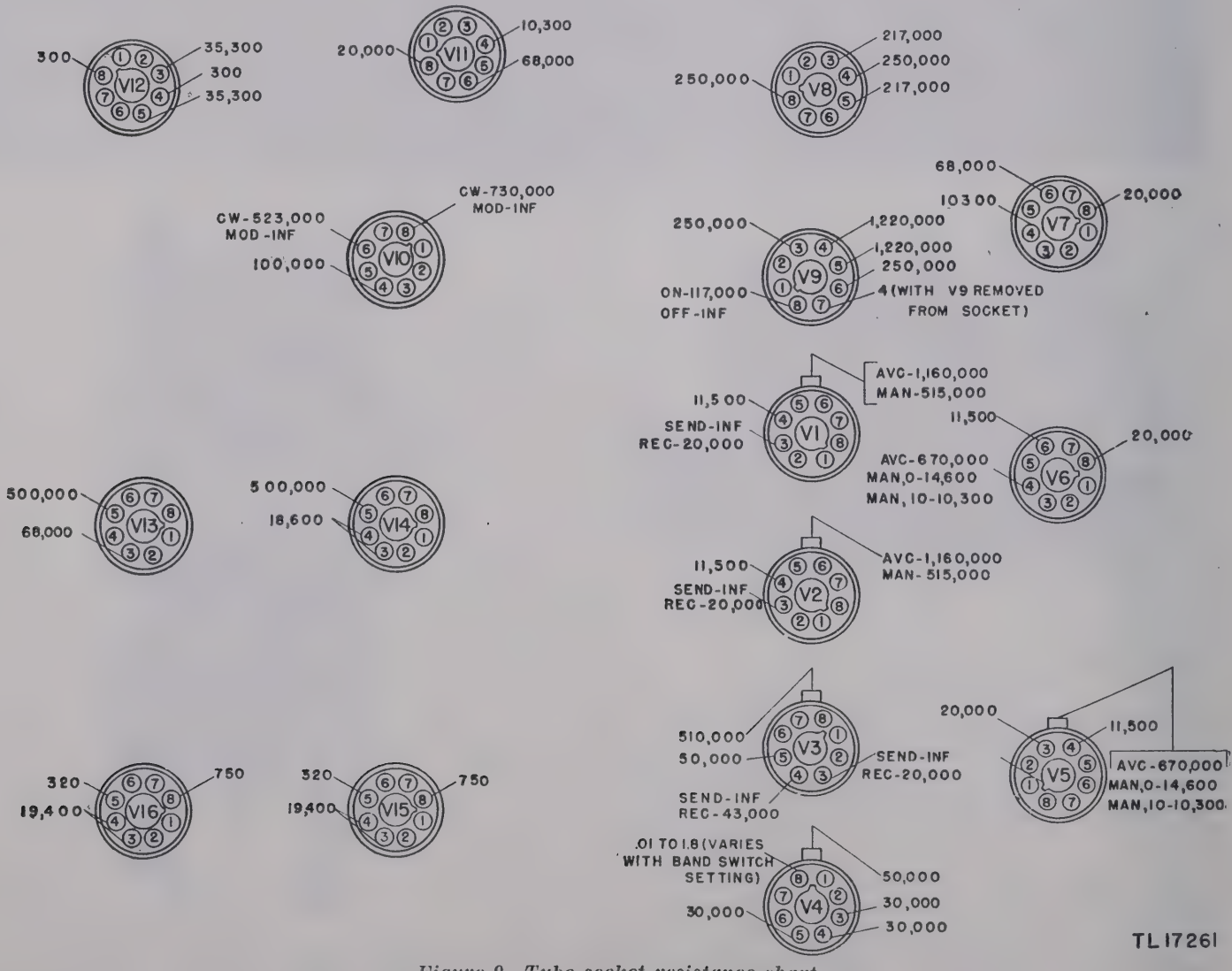

Figure 9. Tube socket resistance chart.

pear to be functioning properly when first placed into operation.

b. Resistance Measurements. To minimize the risk of danger to personnel and damage to equipment that could be caused by applying power to a short-circuited receiver, and to check for the presence of undesired open circuits, make the resistance measurements indicated in figures 9 and 10. When resistance measurements have been found to be correct, skip to *d* below and continue procedure.

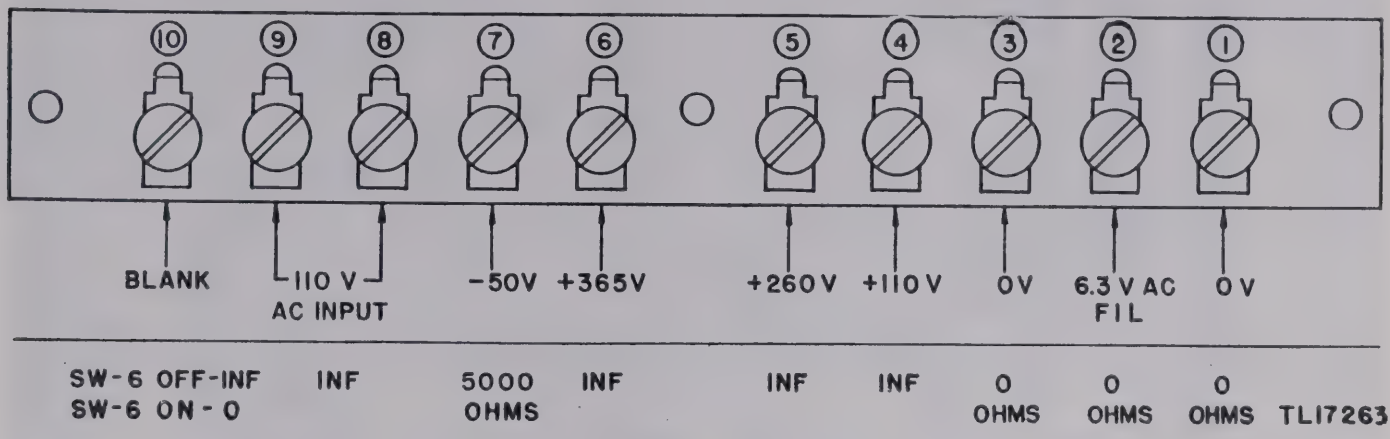

Figure 10. Resistance and voltage measurements for terminal strip E4.

The conditions for these resistance measurements are:

(1) All removable parts shall have been replaced in the receiver, with the exception of the tubes.

(2) No power applied to receiver.

(3) Take all measurements between the specified points on figures 9 and 10 and receiver chassis.

(4) Set receiver controls as follows:

Control	Setting
SENSITIVITY	0
AUDIO GAIN	0
SIGNAL-MOD-CW	CW
SEND-REC	REC
LIMITER	ON
AVC-MANUAL	MANUAL

c. Incorrect Resistance Measurements. If a measurement is taken that varies more than ± 10 percent from the required readings, determine the cause and correct it. The circuit diagram for the receiver being tested (figs. 57, 58, or 59) will prove helpful in tracing circuits from stage to stage. For detailed information on an individual stage that is suspected of being faulty, refer to that stage in paragraphs 42 through 57.

d. Replacement of Tubes. When resistance measurement requirements have been properly met, replace the tubes in their proper sockets. See figure 4 or the location diagrams riveted to the top of the tuning unit.

e. Connection of External Power Unit. Connect the receiver to the power supply as illustrated in figures 11 and 12. Be sure that the power supply is not turned on. For convenience and safety in further testing and aligning, the receiver should be stood on the end which places relay terminal strip E2 closest to the work bench. This method is the safest.

Caution: Be careful to avoid any contact with relay terminal E2 while power is on. It is dangerous. Be equally cautious about making a contact with pin No. 6 of terminal strip E4.

(1) With the power supply still turned off, remove the sheet metal covers from the terminal strip (E1) on the power supply unit and from the terminal strip (E4) on the rear of the chassis. See that all 10 screws on each strip are unscrewed at least three turns, then attach one end of the connector cable to each terminal strip *exactly* as shown in figure 11 and tighten all the screws securely. Make certain that each slotted spade lug on the cable strip makes contact with its respective screw terminal *only. A lug jammed between two screws will cause much damage.* After tightening the screws, replace both metal covers immediately, and *never* remove them while the power supply is connected to the a-c power line.

(2) The spacing of the spade lugs on the cable terminal strips is exactly the same as the spacing of the screws in the terminal strips on the receiver and power unit. If the two do not assemble easily, *do not use force.* Examination of

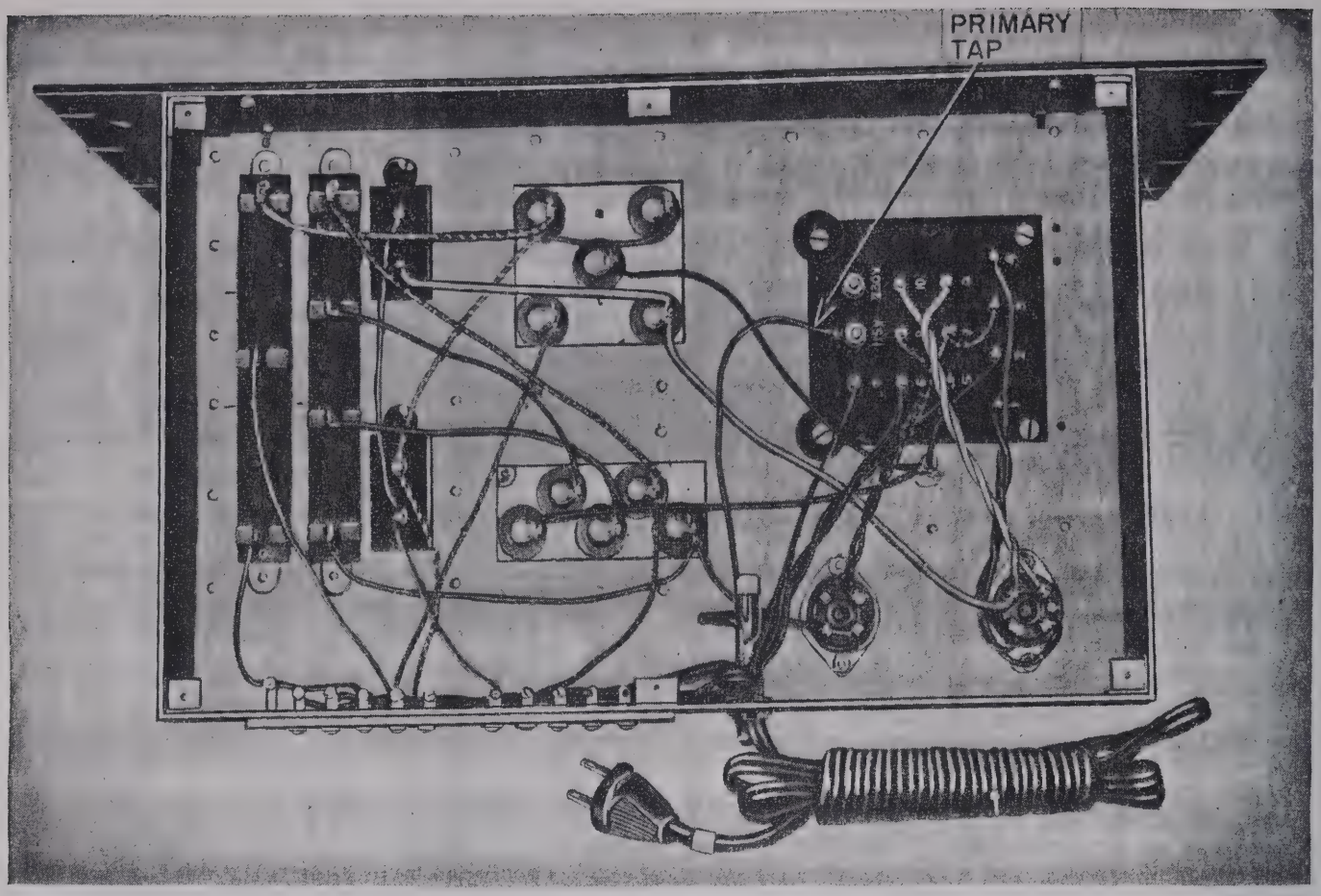

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Figure 11. Bottom view of power supply, cable connections.

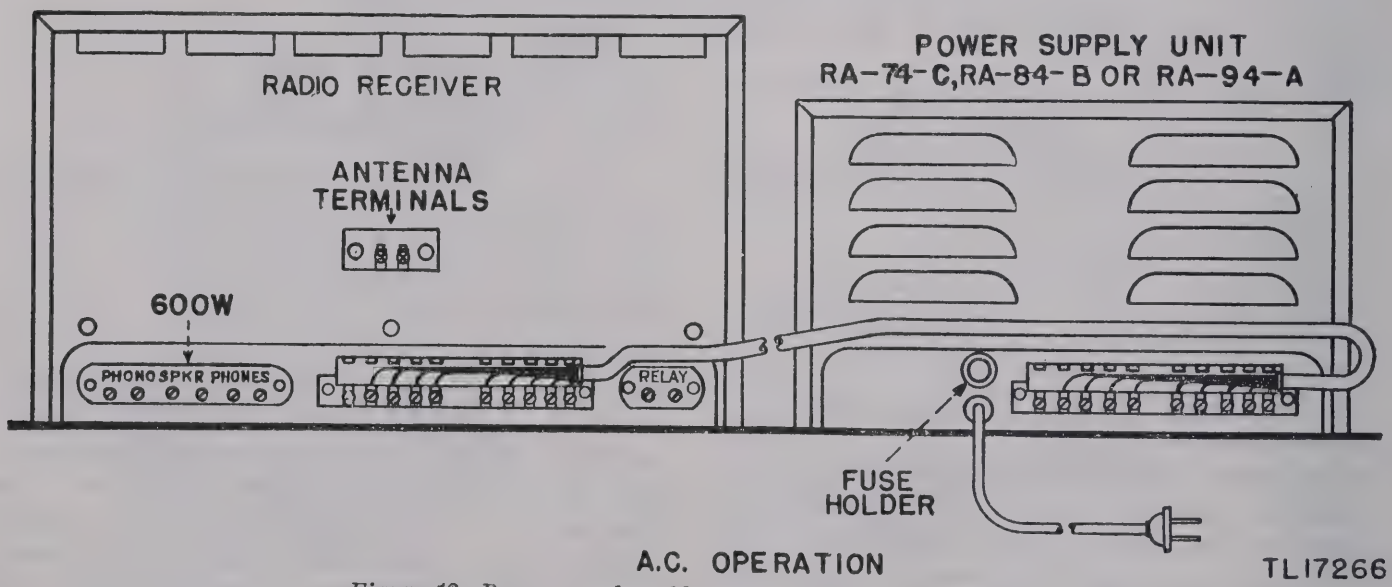

Figure 12. Power supply cable connections for a-c operation.

the work may show that the screws are not unscrewed far enough. If one of the spade lugs has been bent or pushed out of place by rough handling, it should be straightened before reattaching. The spade lugs should slip under the screws easily from the top.

f. Connection for Battery Operation. The cable used for battery connection has only one terminal strip (W2), the other end is made of eight loose wires. Connect this battery cable to the receiver first and replace the metal terminal cover before connecting the cable to the batteries. When disconnecting battery power supply, detach battery ends of cable *first*.

g. Antenna. The antenna input can be coupled to a balanced transmission line of about

115 ohms impedance or to a single wire antenna and ground. There is an electrostatic screen between primary and secondary of each antenna input transformer. This screening, plus a two-wire balanced lead-in, cuts noise pick-up to a minimum.

(1) Connect the feeders to the terminals marked A at the rear of the receiver.

(2) When a single wire antenna is used, connect its lead-in to one of the A terminals. Connect the other A terminal to a good ground.

(3) The receiver does not have to be grounded for proper operation. If a ground is desired, it can be done by connecting a wire under one of the knurled thumbscrews that hold the dust covers to the rear of the chassis.

h. Earphones. A headset may be used by plugging it into the PHONES jack (J1), or by connecting it to the screw terminals marked PHONES on the rear of the chassis.

15. Operating Procedure

Set controls as follows:

Control	Position
CRYSTAL SELECTIVITY	OFF
PHASING	ON ARROW
BAND WIDTH	3
LIMITER	OFF
AVC-MANUAL	AVC

Control	Position
SENSITIVITY	10
BAND SPREAD	100
SIGNAL-MOD-CW	MOD
AUDIO GAIN	6
SEND-REC	REC
BEAT OSCILLATOR	0

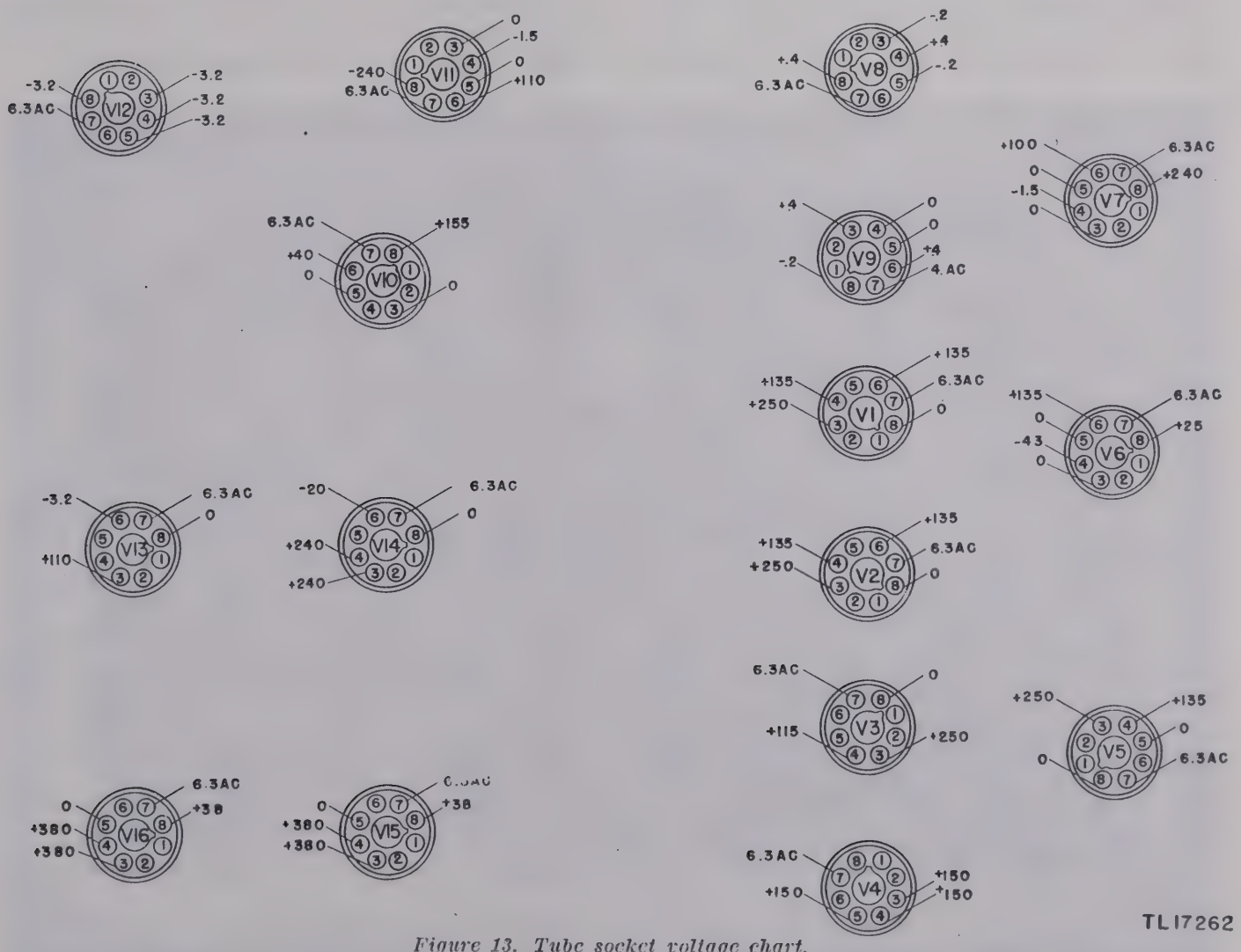

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Figure 13. Tube socket voltage chart.

Connect the power supply and throw the OFF-ON power switch in the center of the receiver panel to ON. This puts the receiver in operation. If the receiver fails to operate, check all connections to the power supply and to the power source to determine that the proper voltage is being delivered to the receiver. As the receiver warms up, inspect it for any signs of abnormal operation such as smoking, arcing, or crackling. Try to detect any odors that would indicate burning of parts, insulation, etc. If any abnormal indications are present, turn power off. Locate the cause of the abnormality by checking each component part of the circuit in which the abnormality was observed. Replace any part found faulty and correct any trouble found before proceeding. If no abnormal indication appears, measure the voltage between the terminals of terminal strip E4 and the receiver chassis. (See fig. 10.) Correct readings will indicate that the power supply is functioning properly. Incorrect voltage readings at terminal strip E4 indicate improper operation of the power supply. Check the power supply and obtain correct readings at E4 before proceeding. When it has been determined that the voltages at E4 are correct, check the voltages between tube pins and chassis and verify them with those given in figure 13.

16. Control Adjustments

Adjust the band switch (SW1) to the band most likely to be active and set the BAND WIDTH control at 3. If interference is not serious, the BAND WIDTH control can be adjusted to a wider degree of selectivity depending on the amount of fidelity desired. In general, this control should be adjusted to the band width giving the best tone quality and the least interference. All tuning is to be done with the BAND WIDTH control set at 3, with or without using the S meter. Make band width adjustments *after* the signal is properly tuned. The LIMITER-OFF-ON control turns the noise limiter on or off. The LIMITER is most useful on the higher frequencies where interference is greatest.

a. Code Reception. Turn the AVC-MANUAL switch to MANUAL and turn down the sensitivity control to provide proper sensitivity.

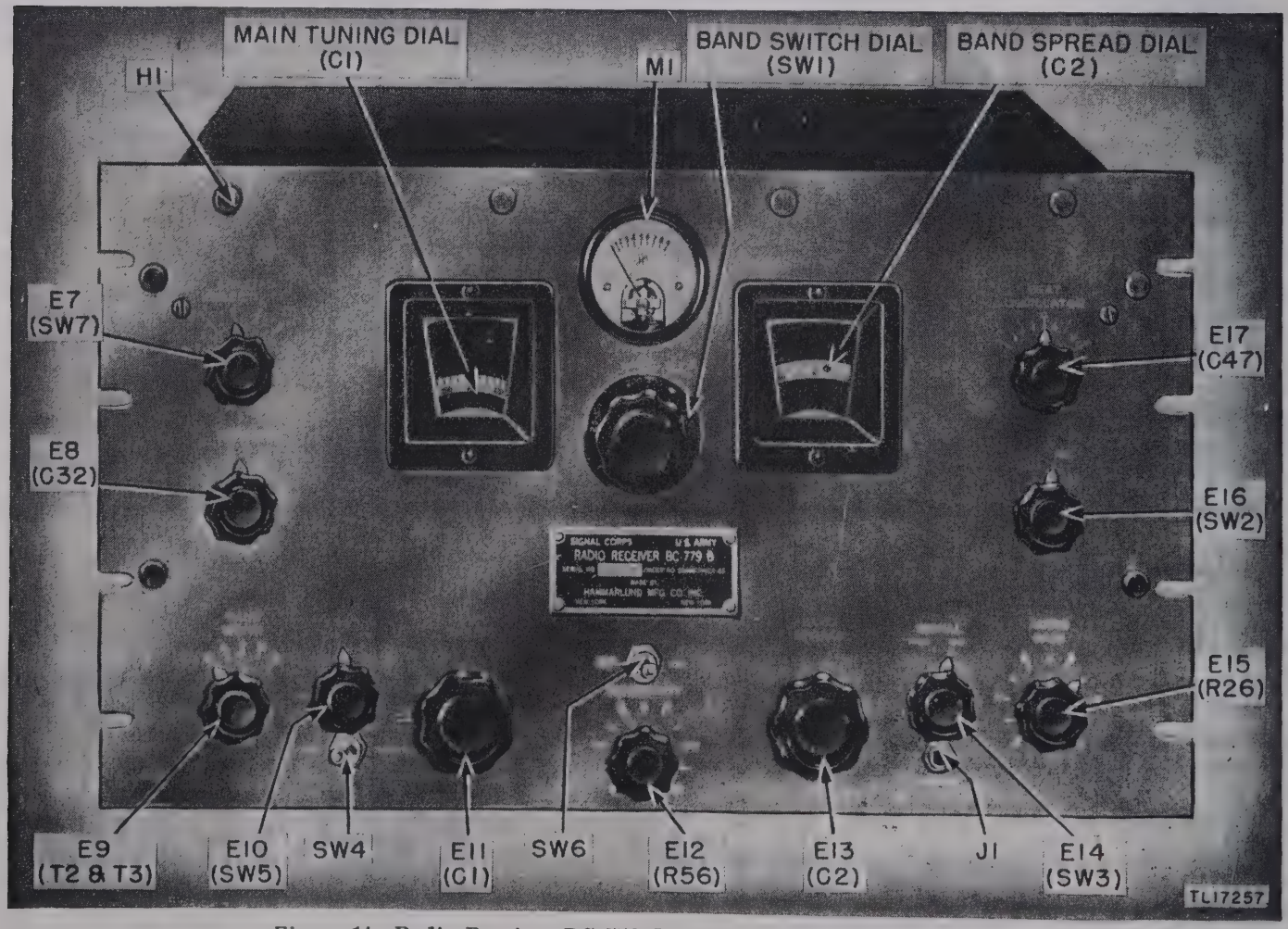


Figure 14. Radio Receiver BC–779–B, front panel parts identification.

(1) On strong signals turn SENSITIVITY control down to avoid overloading. By setting the AUDIO GAIN control at 7, volume may be regulated by the SENSITIVITY control alone.

(2) To turn on the beat oscillator, set the SIGNAL-MOD-CW switch at CW. The BEAT OSCILLATOR control varies the pitch of the beat between the oscillator and the incoming (CW) signal, and is very useful in locating a weak signal.

(3) Fading signals can be controlled by returning the AVC-MANUAL switch to AVC.

b. Crystal Filter. The first three positions of the CRYSTAL SELECTIVITY control are generally used for radiophone reception and will serve for code reception where interference is not serious. *The last two positions are for code reception only.* After selectivity has been adjusted, the PHASING control can be used to correct heterodyne whistle.

c. S Meter Tuning. The S meter (M1) is a tuning guide and operates only when the receiver is set for AVC. This meter is not present on the BC–1004–D. Its reading will increase as the receiver approaches resonance with the incoming signal. Exact resonance is shown by the greatest meter reading.

(1) The BAND WIDTH control must be set at 3 for accurate tuning by means of the meter.

(2) A screw driver adjustment (R41) at the rear of the chassis near the second detector diode varies the resistance in shunt with the meter. By means of this adjustment, an S9 reading may be obtained on any input between approximately 10 and 10,000 microvolts. The normal factory adjustment is on an input of 50 microvolts, and when so adjusted each S number represents a change in signal input of approximately 6 decibels.

SECTION V
ALIGNMENT PROCEDURE

17. Alignment with Signal Generator and Output Meter (figs. 15 and 16)

a. General. Throw the OFF-ON switch to ON and let the receiver warm up thoroughly, an hour if practicable, before alignment. Connect the output meter to the SPKR terminals located at the rear of the receiver chassis.

Note. Radio Receiver BC–1004–D was not originally equipped with a tuning meter (S meter). Therefore, when any reference is made to the S meter it shall be understood to apply to the output meter in cases where Radio Receiver BC–1004–D is the receiver being aligned except when otherwise stated in the text.

The alignment procedure presented is described for only one frequency band. The procedure for all bands is the same except for the input signals. All bands are to be properly aligned at their operating frequencies.

b. I-f Alignment. Adjust the signal generator to 465 kilocycles, and connect the output to the control grid cap of the first detector tube (V3) through a fixed capacitor (approximately 250 mmf). Set controls as follows:

Control	Setting
SENSITIVITY	0
AVC-MANUAL	MANUAL
SIGNAL-MOD-CW	MOD
SEND-REC.	REC.
BAND SWITCH	2.5-5.0 mc.
AUDIO GAIN	10
CRYSTAL SELECTIVITY	OFF
PHASING	ON ARROW
BAND WIDTH	3
BAND SPREAD DIAL	100

Set the MAIN TUNING dial near 2.5 megacycles, without tuning in a powerful local signal. Set the CRYSTAL SELECTIVITY switch on 3, the AVC-MANUAL switch on AVC, and advance the SENSITIVITY to 10. Turn off the modulation of the signal generator and adjust its frequency slightly until you get maximum deflection on the S meter. The adjustment of the signal generator in this manner is necessary to get exact agreement with the natural period of the particular quartz crystal in the receiver being aligned. After reducing SENSITIVITY to 0, the modulation may be switched on, but the tuning of the signal generator must not be altered until the alignment is completed. Return the CRYSTAL SELECTIVITY and AVC-MANUAL controls to their original settings of OFF and MANUAL and advance the SENSITIVITY control until you get a half-scale output reading of between 5 and 10 volts. Check the alignment of both upper (grid) and lower (plate) air trimmer capacitors in i-f transformers T2 and T3 and the single trimmer in T4 for peak reading of the output meter. If one or more of these adjustments results in a sizable increase of output, reduce the SENSITIVITY control enough to bring the meter reading back to half-scale. Alignment of the plate circuit of the crystal filter (T1) can be tested in the same way by means of the lower adjusting screw on the side of the unit. This screw varies the position of the powdered iron core of coil L26.

Caution: Do not change the setting of the upper adjusting screw which tunes grid coil L27; this circuit cannot be adjusted properly with the output meter.

It can be aligned by the use of frequency-modulated signal generator and cathode-ray oscillograph. (See par. 18.)

c. Alignment Check. Leave all other controls as above, and do not change the signal generator frequency. Reduce AUDIO GAIN to 0, switch to AVC and increase SENSITIVITY to 10. Increase AUDIO GAIN to restore half-scale reading on the output meter and adjust the single trimmer capacitor in T6 for output meter reading. The S meter should peak at the same time that the output meter reading dips.

d. Beat-Frequency Oscillator Alignment Check. Keep all controls as in the a-v-c alignment check, switch off the output meter, and plug in a pair of headphones or a suitable loudspeaker. Throw the SIGNAL-MOD-CW switch to CW and see that the BEAT OSCILLATOR control is at exactly 0 (zero). Readjust the trimmer capacitor near the bottom of T5 until the tone in the phones or speaker is at its lowest pitch (zero beat). If the beat-frequency oscillator is in perfect alignment, no sound will be heard, since the signal generator and the beat-frequency oscillator will be oscillating at the same frequency with no audible difference or beat. This can be checked off 0 (zero), toward either side. If this causes a tone which rises in pitch as the

pointer is moved out, the beat-frequency oscillator may be considered operating perfectly.

e. High-Frequency Oscillator Calibration Check. The accuracy of the MAIN DIAL calibration depends solely on the h-f oscillator frequency which, on all bands of the basic receivers except the 20- to 40-megacycle (mc) band of receiver BC–794–B, is 465 kc (the i-f) higher than the signal frequency. In the BC–794–B the h-f oscillator is 465 kc below the signal frequency on the 20- to 40-mc band. To check calibration, tune in signals of known frequency on each band and note the MAIN DIAL reading. If it does not agree with the known frequency of the signal being received, the calibration is off. To correct dial calibration, see figures 17, 18, and 19 for location of h-f oscillator adjustments as well as the signal frequencies at which adjustments should be made. The signal generator may be set for the lower end of the band, and its second harmonic, if strong enough, may be used at the upper end. The output of the signal generator should be unmodulated and the SIGNAL-MOD-CW switch on the receiver should be set at CW, the BEAT OSCILLATOR control at zero, and the BAND WIDTH at 16. Disconnect output meter and use headphones or a loudspeaker to make the necessary adjustments by the zero beat method. The signal generator is to be connected to the antenna terminals for this test. If this test is made, for example, on the 2.5- to 5.0-mc band and the signal generator is tuned for 2.5 megacycles, the second harmonic is used at the 5.0-mc end of the band. Tune the second harmonic at the 5.0-mc end of the dial to zero beat. If the dial is off the 5.0-mc calibration line, turn the dial toward the correct setting just enough to set up a high pitched tone, but not enough to go above audibility. With the alignment screw driver, adjust the trimmer capacitor marked h-f oscillator (5.0-mc) until the beat is returned to zero. Repeat this until the dial has been returned to a correct reading and zero beat. After aligning the 5.0-mc end of the band, tune the 2.5-mc fundamental at the low-frequency end of the main dial, and correct the calibration step-by-step as before, using the inductance trimming adjustment h-f oscillator (2.5 mc). The second harmonic will now be found out of line again, when tuned, since the adjustment at one end of the band affects the other end of the band. A back-and-forth check and readjustment will be necessary to bring both ends of this band into exact agreement with signal frequency and dial calibration.

Caution: Adjust the sensitivity control carefully to avoid overloading or reception of superior signals due to too great amplification.

f. R-f and First Detector Alignment. Accurate calibration and modulation of the signal generator is not required to check these adjustments. The input to the antenna terminals should be through approximately 100 ohms, including the output resistance of the signal generator. If the signal generator is modulated, the receiver controls should be set as for i-f alignment; if unmodulated, set BEAT OSCILLATOR knob to 2 (on either side) and SIGNAL-MOD-CW switch to CW. Adjust SENSITIVITY to produce a half-scale reading on the output meter when the signals are exactly in tune. Starting with the 2.5- to 5.0-mc band, set the main dial at 5.0 megacycles with band spread dial at 100, and adjust the frequency of the signal generator to peak deflection of the output meter. Check the setting of the trimmer marked first detector and 5.0 megacycles. (See figures 17, 18, or 19.) Repeat this procedure on trimmers indicated as 2d RF and 1st RF in the same row. If readjustment of the settings results in an increase in output meter reading, alter the SENSITIVITY control to reduce the reading to half scale. Check the tuning of the receiver after each adjustment to see that the test signal is accurately tuned. The band spread control may be used as a vernier for this purpose on the bands in which it operates.

Note. This tuning check is extremely important at the high end of the 10- to 50-mc bands where there is some slight interaction between the first detector and h-f oscillator circuits. After checking the three trimmers at the high end of this band, turn the main dial to 2.5 megacycles and re-tune the signal generator to suit. Check the three inductance adjuster settings marked 2.5 megacycles in the same row. Since adjustments at one end of the band also affect the other end of the band, it will be necessary to repeat the procedure until no further improvement can be secured. The rest of the gangs can be checked in the same manner. For greatest efficiency with a particular antenna arrangement, the r-f circuits may be adjusted without being disconnected. This can be done by loosely coupling the output of the signal generator to the antenna system, instead of directly to the antenna terminals through a 100-ohm resistor. The signal from the signal generator must reach the receiver by way of the antenna, not by some form of indirect coupling. Headphones or a speaker should be used on all tests to monitor the signal to avoid false adjustments due to overloading and freakish or superior signal responses.

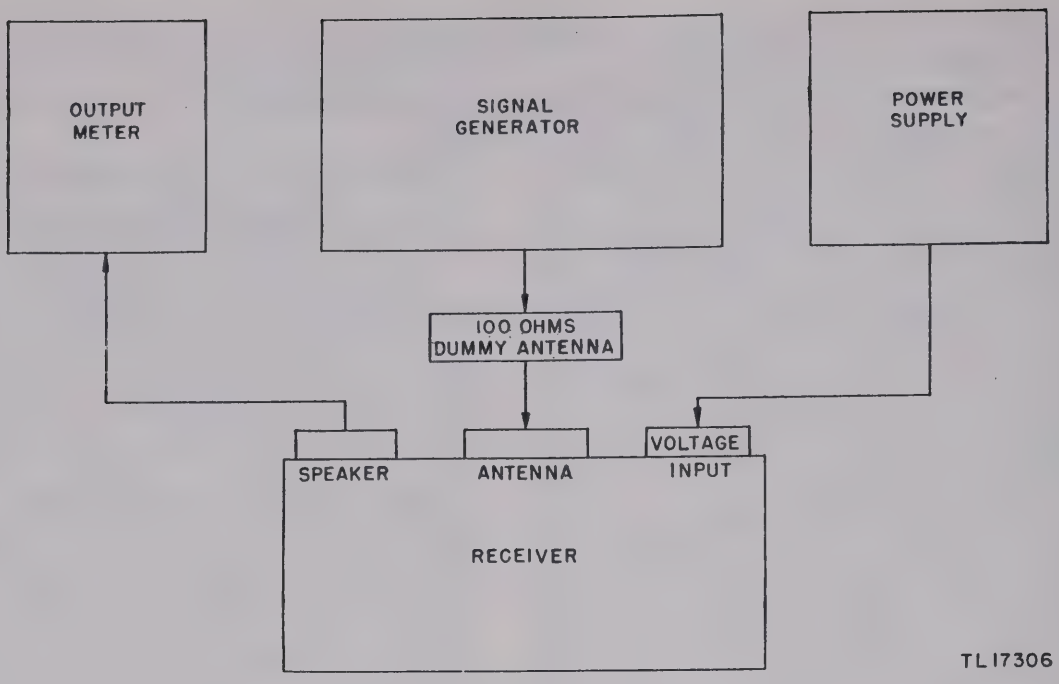


Figure 15. Block diagram of alignment set-up using output meter.

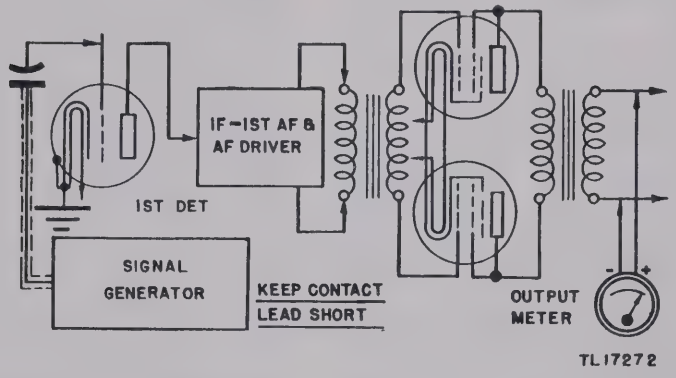


Figure 16. Typical signal generator connection diagram.

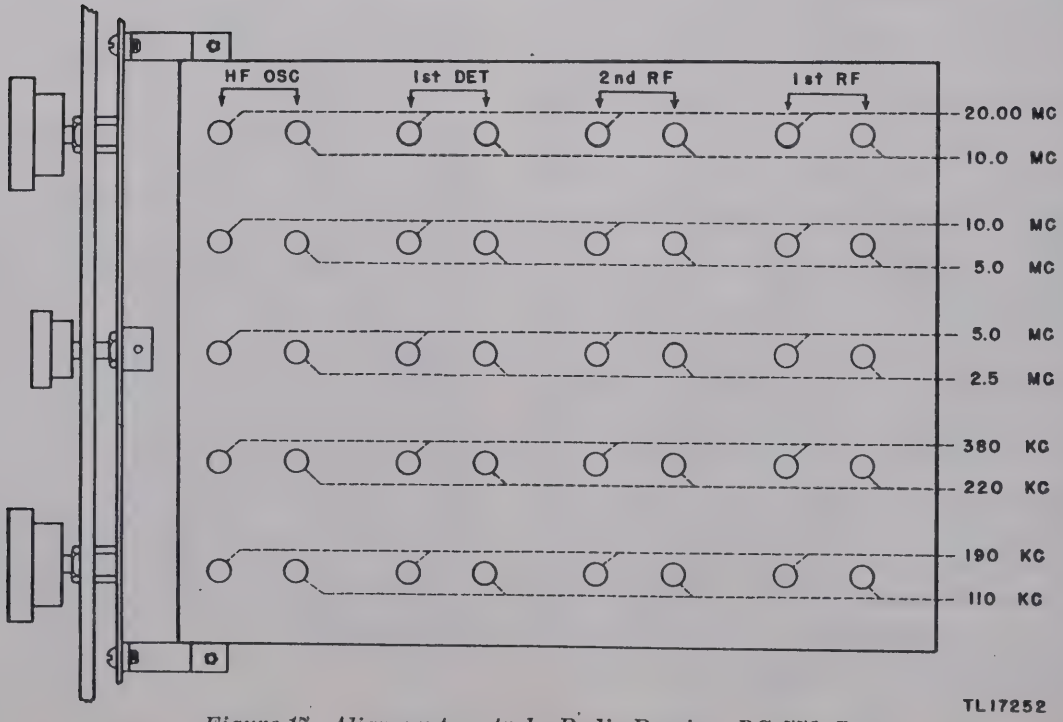


Figure 17. Alignment controls, Radio Receiver BC-779-B.

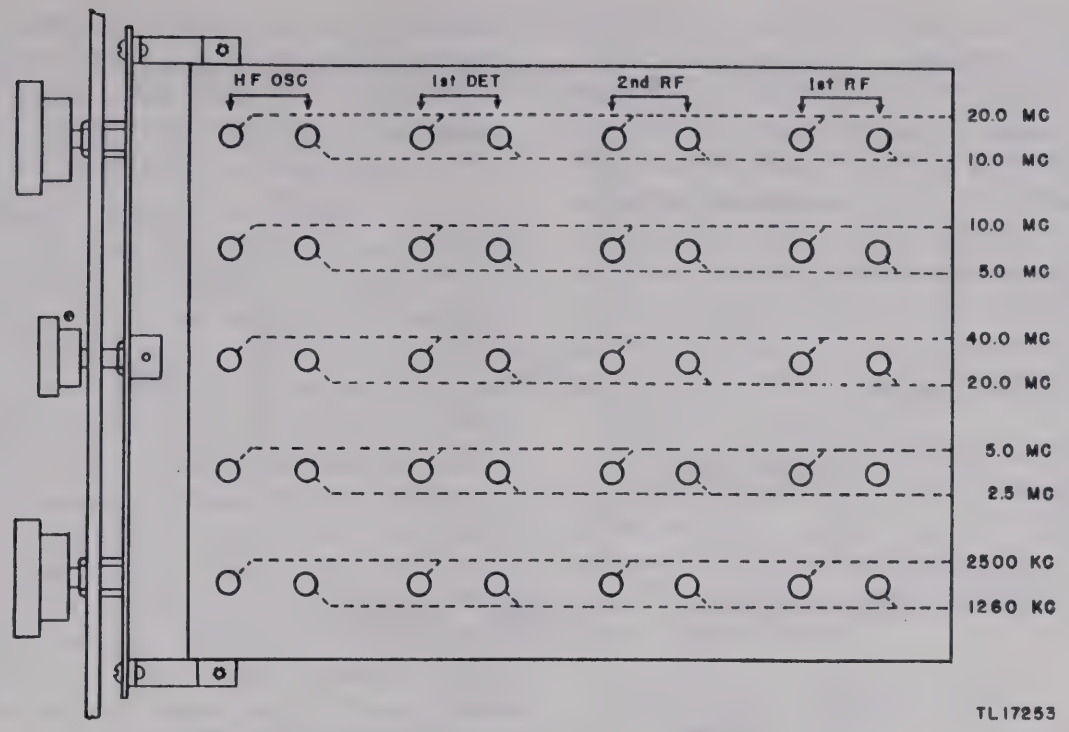


Figure 18. Alignment controls, Radio Receiver BC-794-B.

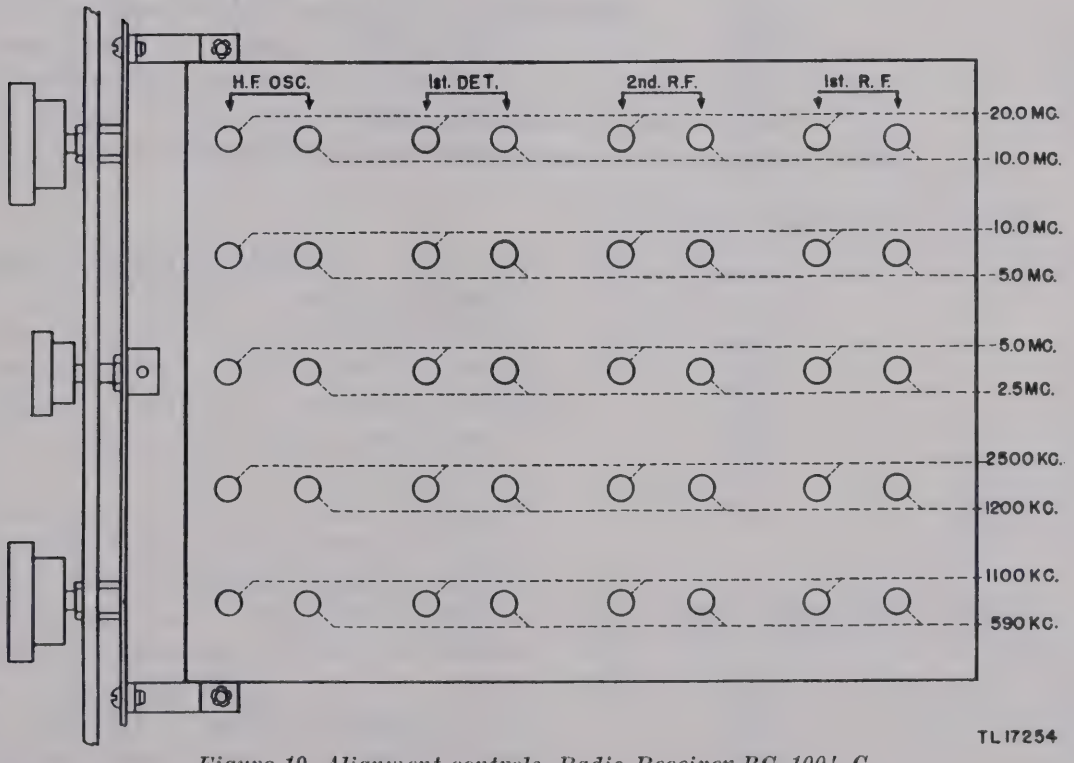


Figure 19. Alignment controls, Radio Receiver BC-1004-C.

18. Alignment with Frequency-Modulated Signal Generator and Oscillograph (fig. 20)

Connect the input of the vertical plates of the oscillograph to the PHONO connections on terminal strip E3 on the rear skirt of the chassis. The high terminal is the second one from the end of the strip; the first screw being connected to the chassis. Set the frequency-modulated (f-m) signal generator to 465 kilocycles, and connect its output to the control grid cap of the first detector (V3) through a fixed capacitor approximately 250 mmf. With the CRYSTAL SELECTIVITY switch at OFF, readjust the signal generator frequency to produce the conventional single-peaked resonance curve on the screen of the oscil

lograph. Now turn the CRYSTAL SELECTIVITY switch to position 1. If the grid coil (L27) is correctly tuned, the image in the oscillograph screen will remain symmetrical, but will be only about two-thirds as wide as before, indicating an increase in selectivity. The oscillograph image is also affected by the PHASING control, maximum symmetry occurring at or very near the arrow on its scale. Therefore, when tuning L27, slowly rotate the PHASING CONTROL back and forth at the same time to secure closest adjustment.

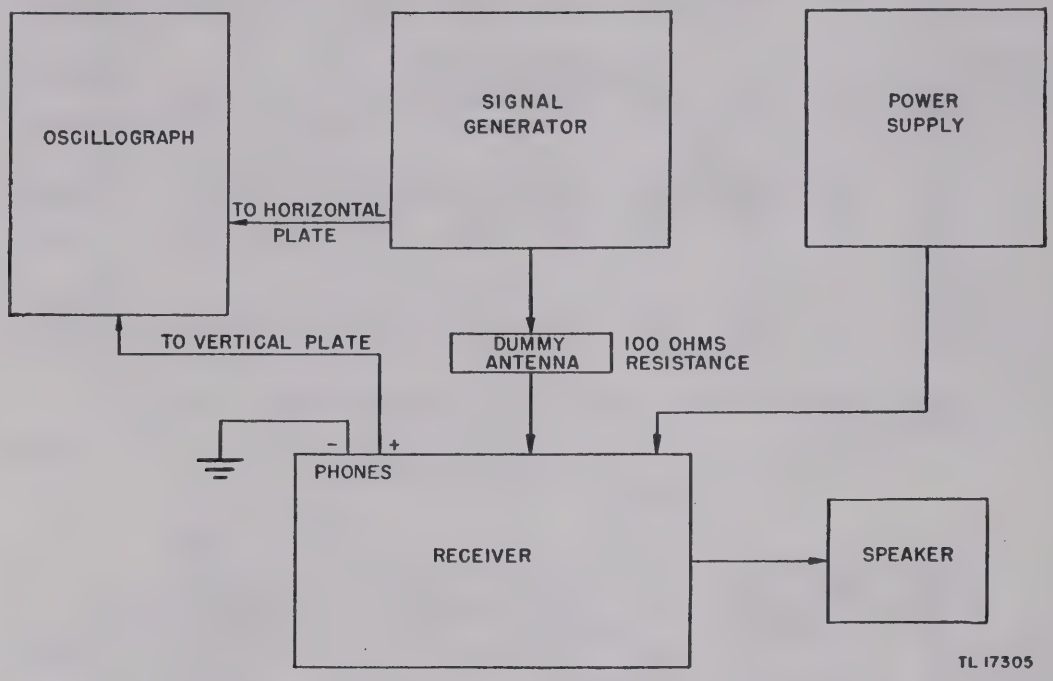


Figure 20. Block diagram of alignment set-up using oscillograph.

SECTION VI
DETAILED TROUBLE-SHOOTING PROCEDURES

19. Localizing Trouble to a Stage

Even though the resistance and voltage measurements are apparently correct, the receiver may be inoperative, have a low output, or show signs of trouble. Probable causes of failure are listed in paragraph 20. If the trouble cannot be traced to conditions listed there, the defective stage may be located by signal substitution or signal tracing. (See par. 22.) A simple test called circuit disturbance test for locating a faulty stage is to touch the control grid of each tube with the metal blade of an insulated screw driver, working back from the output section to the first r-f stage. If no click or hum is heard through the loudspeaker, the stage may be bad. Check the tubes. Touch the grid again and if there is still no response, the trouble may be located between the last point giving a response and the tube that seems dead. If a stage is defective, refer to the paragraph covering the stage under test. (See sec. VIII.) Trace the trouble to the defective part or parts by resistance and voltage checks..

20. Probable Causes of Failure

a. If the set is inoperative and the S meter deflects when the dial is rotated, it may indicate failure between the second detector and the audio output stage. A check of the successive stages beginning with the second detector may localize the failure.

b. If the S meter does not deflect as the dial is rotated and the fuse in the power supply is not burned, a failure between antenna and the second detector or improper power supply voltage input may be indicated. Check voltage at input terminal and test for defective stage.

c. Weak reception or partial deflection of the S meter may be caused by too low screen or plate voltages, shorted bypass capacitor in the plate, or return screen circuits, or a short in the SENSITIVITY CONTROL. A check of the plate and screen voltage in the r-f stages, first detector, and i-f stages, and a check of the SENSITIVITY control for an open circuit may correct this.

d. Distorted reception may be due to a shorted grid capacitor or a shorted coupling capacitor in the audio stages. To locate the defective audio stage use headphones with a 0.01-mf capacitor in series with one lead and ground the other lead.

e. Noisy reception and fading may be caused by a faulty contact in the SENSITIVITY or the AUDIO GAIN control, defective tubes, near-end life of batteries, faulty connections, or a defect in the antenna system.

f. Heavy hum in the output may be caused by an open or partially shorted filter capacitor, or defective choke coil in the power supply, or improper line voltage frequency.

g. The following parts may burn out if listed capacitors are shorted.

(1) Radio Receiver BC–779–B.

Shorted	May burn out
C6	R4
C10	R8
C18A	R15
C19A	R17
C20A	R21
C27	R35
C43	R47
C53	R51

(2) Radio Receiver BC–794–B.

Shorted	May burn out
C18A	R15
C19A	R17
C20A	R21
C27	R35
C43	R47
C53	R51
C57	Tuning coils for frequency set on dial
C58	Tuning coils for frequency set on dial

(3) Radio Receiver BC–1004–C.

Shorted	May burn out
C6	R4
C10	R8
C18A	R15
C19A	R17
C20A	R21
C27	R35
C43	R47
C53	R51

21. Audio Circuit Check

The audio circuit can be checked by using an audio-signal generator connected to the PHONO terminals at the rear of the receiver, and a

speaker attached to the SPKR terminals. For an a-f output voltage check, substitute an a-c voltmeter with a resistance of 1,000 ohms per volt, for the speaker. Set controls as shown below:

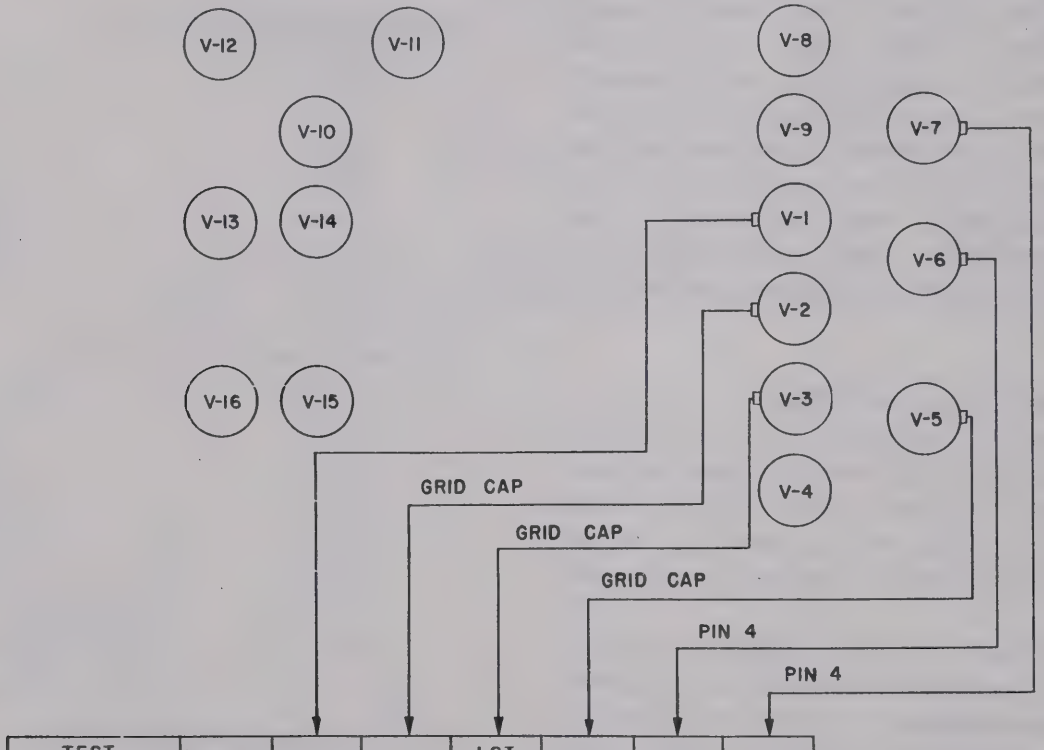
Control	Setting
SENSITIVITY	Maximum
AUDIO GAIN	Maximum
SIG-MOD-CW	CW
AVC-MANUAL	MANUAL
LIMITER	OFF
CRYSTAL FILTER	OFF
SEND-REC	SEND
BAND WIDTH	3

a. Turn on the audio signal generator and inject a 400-cycle note into the audio circuit. A clear loud tone should be heard. To check the circuit for proper output voltage, adjust the signal generator output for a 0.3 volt signal and connect it to the receiver. The receiver output should be approximately 50 v (4 watts). These values are not critical.

b. If the audio output is below normal, replace V13, V14, V15, and V16 in turn and test as shown above after each tube substitution. If this does not correct the condition, see paragraphs 42 through 57 for information on the individual stages and test all parts of the faulty stage.

22. Signal Tracing Analysis and Chart (fig. 21)

Signal tracing is a quick and effective method of locating a defective stage. A signal of variable strength for a standard receiver output is injected into each stage, starting from the third



TEST POINT	*ANTENNA	1ST RF	2ND RF	1ST DETECR	1ST IF	2ND IF	3RD IF
SIGNAL FREQUENCY	10 MC	10 MC	10 MC	465 KC	465 KC	465 KC	465 KC
GENERATOR OUTPUT IN MICROVOLTS	.05-1.0	1.-4.	6-16	25-60	180-540	2,800-6,200	50,000-100,000

*100 OHMS TOTAL IMPEDANCE FOR ANTENNA INPUT

ALL READINGS TAKEN ACROSS A 600 OHM LOAD FROM SPKR TERMINALS. TL 17310

Figure 21. Signal tracing analysis chart.

i-f and working forward to the antenna. Set the controls as shown below:

Control	Setting
SENSITIVITY	Maximum
AUDIO GAIN	Maximum
SIG-MOD-CW	CW
AVC-MANUAL	MANUAL
LIMITER	OFF
CRYSTAL FILTER	OFF
SEND-REC	REC
BAND WIDTH	3

Minimum and maximum signal voltages and generator frequency per stage are given in figure 21 for a standard output of 4 watts (50 v). An r-f signal generator is used and *is not coupled directly* to the grid but is applied through a 0.1-mf capacitor, as shown in the block diagram at the bottom of the chart. If the applied signal within the limits given in the chart does not give a 4-watt (50v) receiver output across a 600-ohm load, the stage is not giving proper gain. Replace the tube, realign the receiver, and retest. If the stage is still abnormally low, check for a faulty component by referring to the voltage and resistance data and description of component parts in paragraphs 42 through 57, for each individual stage.

23. Measuring Individual Stage Gain

The gain per stage may be computed by applying a fixed-strength signal to the third i-f stage of sufficiently high voltage to give a receiver output reading. See the ratios listed below. The ratios listed are those of the voltage applied to the preceding stage to that applied to the stage under test to obtain a given output from the receiver. The third i-f is computed against an input of 300,000 microvolts to the second detector for a 4-watt (50-v) output. Apply the signal in succession, from the third i-f stage to the antenna. The signal (400 cps, 30 percent modulated) frequency should be the same for each stage as shown in figure 21.

Stage	Ratio
3d i-f	4:1
2d i-f	17:1
1st i-f	14:1
Mixer	7:1
2d r-f	3:1
1st rf	5:1
Antenna	4:1

24. Moistureproofing, Fungiproofing, and Refinishing

When the receiver has met the minimum test requirements (par. 27) and is functioning properly, see TB SIG 13, 7 March 1944, and process the equipment as directed. Straighten out all dents in the case before replacing the cover. Touch up all scratches with wrinkle black enamel. Clean the nameplate and retouch the background where necessary. Refinish the front panel with gray metal primer, or lusterless gray air-drying or baking enamel.

SECTION VII
FINAL TESTING

25. General

After the receiver has been moistureproofed and fungiproofed, it is necessary to make the final tests outlined in this section to be sure that the receiver meets the minimum standards required of Signal Corps class A equipment. In doing so, the repairman will have accomplished the primary purpose of this manual. The following tests are described.

Beat-frequency oscillator.
Calibration accuracy.
Sensitivity (modulated signal).
Signal plug noise to noise ratio.
Sensitivity (c-w signal).
Selectivity (without crystal).
Selectivity (with crystal).
Image rejection ratio.
I-f rejection ratio.
A-V-C characteristic.
Power output to speaker (modulated signal).
Power output to speaker (c-w signal).
Power output at phone jack.

26. Alignment Check

Although the receiver was correctly aligned during the repair procedure, a recheck of this alignment is required after moistureproofing and fungiproofing has been completed. Check alignment with procedure outlined in paragraphs 17 and 18.

27. Test Conditions

a. Unless otherwise specified, all the tests outlined shall be made with the panel controls, or switches, set as follows:

Control	Setting
CRYSTAL SELECTIVITY	OFF
PHASING	ON ARROW
BAND WIDTH	3
LIMITER	OFF
AVC-MANUAL	AVC
SENSITIVITY	10
BAND SPREAD	100
MOD-CW	MOD
AUDIO GAIN	6
SEND-REC	REC
BEAT OSCILLATOR	0
OFF-ON	ON
MAIN TUNING	AS DESIRED
S METER	MAXIMUM INDICATION

b. If the receiver meets voltage and resistance requirements and appears to be properly aligned but still fails to meet the minimum requirements of a test, the conditions shown in the following table should be checked as possible sources of trouble. In all cases the test equipment should be checked for accuracy before using in a test, and for a correct hook-up to the receiver. A check should be made to be sure the power supply is delivering proper power to the receiver.

Test	Possible trouble causes
Beat-frequency oscillator	Does not oscillate at the i-f frequency on the zero setting.
Calibration accuracy	Signal generator used in aligning not correctly calibrated. Alignment off.
Sensitivity	Low emission of tubes or alignment off.
Signal plus noise to noise	Microphonic tubes. Ungrounded shields.
Selectivity	I-f alignment off.
Image and i-f rejection	Interstage coupling leads too long. Leads not properly spaced.
Avc characteristic	Alignment off.
Power output	Low emission of tubes. Alignment off.

c. Use a crystal calibrator to supply an r-f input for the calibration accuracy test. A signal generator of correct frequency and which is capable of producing an r-f voltage modulated 30 percent at 400 cps is to be used on all other tests requiring an r-f input to the antenna.

d. Apply all r-f input signals to the receiver through a 100-ohm dummy antenna.

e. Measure all output voltages with an output meter across a 600-ohm load.

f. All values given are based on the use of Power Supply RA–84–( ).

g. (See fig. 22 for a block diagram of the test set-up.)

28. Beat-Frequency Oscillator

a. Apply an unmodulated signal from an r-f signal generator to the dummy antenna of the receiver being tested.

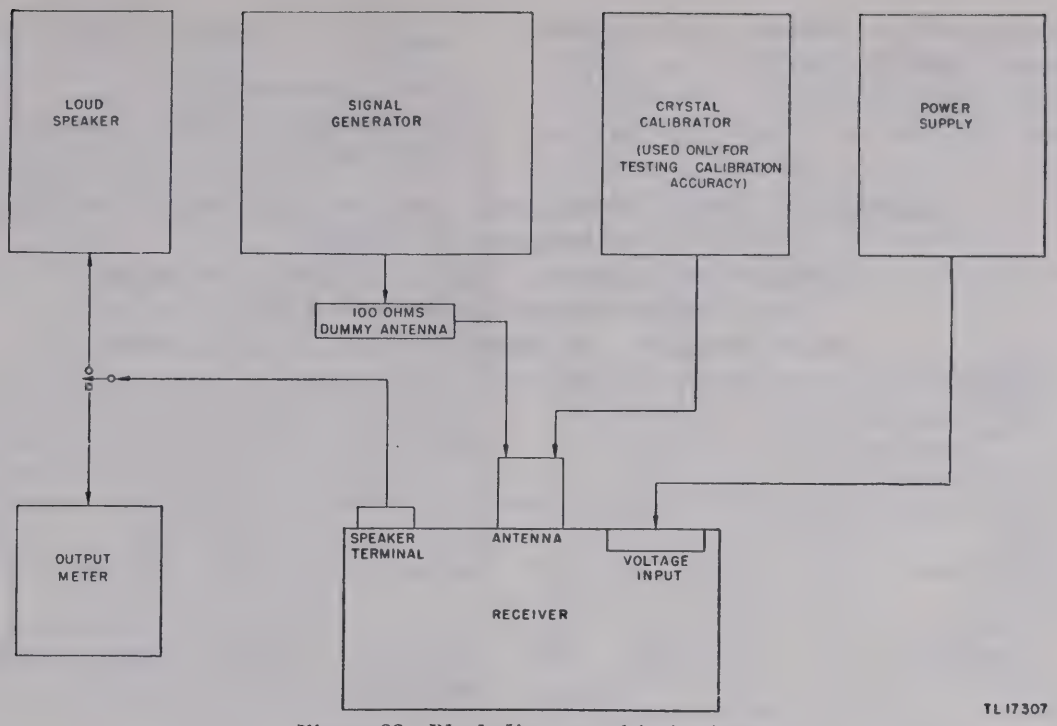


Figure 22. Block diagram of test set-up.

b. With continuous-wave (c-w) reception a zero beat should occur when the BEAT OSCILLATOR control is set at 0.

c. Slowly rotate the BEAT OSCILLATOR control to both sides of the 0 point. An equal deviation from the 0 point to each side of it will result in an equal audio frequency on each side of 0. If this should not be the case, it is probable that the control knob and pointer assembly is not correctly centered on the control shaft.

d. If a zero beat should not be obtainable at all, or is not centered at the 0 point, trouble is indicated in the i-f stages or in the bfo circuit.

29. Calibration Accuracy

a. Connect a suitable crystal calibrator with 100-kc and 1,000-kc secondary frequency standard (accurate to 0.01 percent) to receiver under test as shown in figure 22.

b. Inject a signal from the calibrator at each of the low-, middle-, and high-frequency points of each band. Obtain an audible tone with the use of the BEAT FREQUENCY control.

c. Dial calibration shall be within 1.5 percent of perfect accuracy.

d. A probable cause of inaccurate dial calibration is the use of an off-calibration signal generator during alignment.

30. Sensitivity, Modulated Signal

a. Apply a 30-percent modulated signal from the r-f signal generator to the antenna terminals of the receiver through a dummy antenna.

b. Make tests at low-, middle-, and high-frequency points of each band.

c. Minimum requirements:

Input	Frequency	Output across 600-ohm load
5 mv*_____	20-40 mc_____	17.3 volts
2 mv*_____	all other bands___	17.3 volts

* mv = microvolts

31. Signal Plus Noise-to-Noise Ratio

a. GENERAL. This test is most conveniently made in conjunction with the sensitivity test of paragraph 30.

b. After each portion of each band is tested in accordance with paragraph 30, turn off the modulation of the signal generator and obtain the following minimum output meter readings.

Input	Frequency	Output across 600-ohm load
5 mv*_____	20-40 mc_____	8.6 volts (2:1 ratio)
2 mv*_____	10-20 mc_____	8.6 volts (2:1 ratio)
2 mv*_____	all other bands___	5.7 volts (3:1 ratio)

* mv = microvolts

32. Sensitivity, C-W Signal

a. Apply a c-w signal from the r-f signal generator to the antenna terminals of the receiver through a dummy antenna and adjust BEAT OSCILLATOR to produce a 1,000-cycle tone.

b. Make tests at low-, middle-, and high-frequency points of each band.

c. Minimum requirements:

Input	Frequency	Output across 600-ohm load
1.5 mv*	20-40 mc	17.3 volts
0.6 mv*	all other bands	17.3 volts

* mv = microvolts

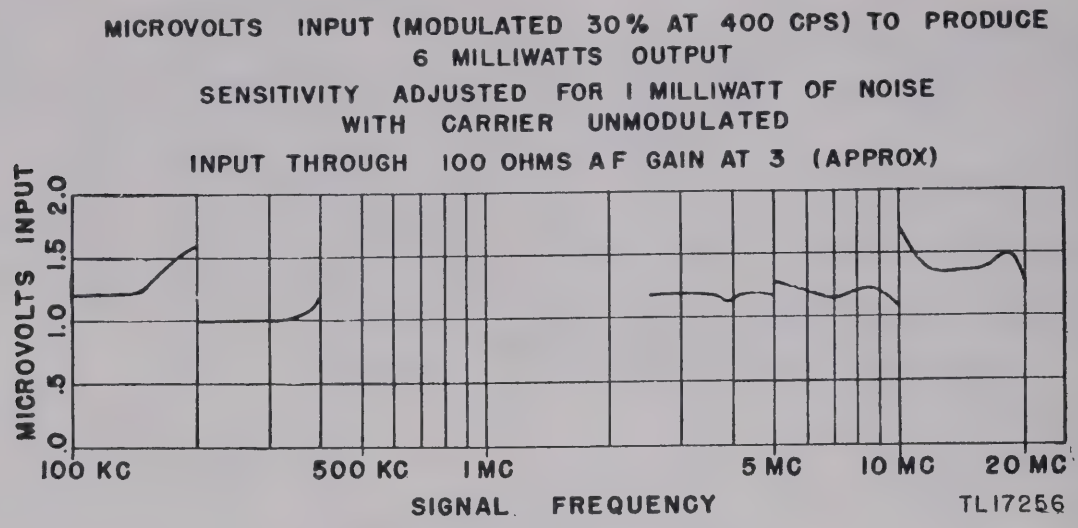


Figure 23. Sensitivity chart.

33. Selectivity without Crystal

a. Set the controls to the standard test setting of paragraph 27 except that the AVC-MANUAL control is to be set to MAN and the AUDIO GAIN at maximum.

b. Test the subject receivers at the following test frequencies.

Receiver	Test frequency
Radio Receiver BC–779–A and –B	380 kc
Radio Receiver BC–794–A and –B	1,300 kc
Radio Receiver BC–1004–A, –B, –C, and –D	590 kc
Radio Receiver R–129/U	540 kc

c. Apply a 100-microvolt, r-f signal at the test frequency given for the receiver under test. Modulate the test signal 400 cps.

d. Adjust the SENSITIVITY control to obtain a reading of 17.3 volts on the output meter.

e. Increase the strength of the test signal from 100 to 1,000 microvolts (10 times test signal) and check band width against the table in step *f* below. Then increase to 100 times and again to 1,000 times the test signal strength and check the band width.

f. Minimum requirements:

Input signal strength	Band width
10x (1,000 mv*)	3.5 to 7 kc
100x (10,000 mv*)	Below 12 kc
1,000x (100,000 mv*)	Below 18 kc

* mv = microvolts

g. Determination of Band Width. (1). When steps *a* to *d* above have been completed and the test signal strength is increased 10 times in accordance with step described in *e* above, the output meter should register a decided increase in output voltage.

(2) Turn the r-f signal to either side of the test frequency. The output voltage should drop. When the output voltage drops to exactly 17.3 volts the signal generator frequency at that point is the band width limit on one side of the test frequency.

(3) Turn the r-f signal in the reverse direction until the band width limit on the other side is reached. This will be when the output voltage passes through its peak and drops to exactly 17.3 volts again.

(4) The difference between the frequency on each side of the resonant frequency is the band width in kc or mc.

34. Selectivity with Crystal

a. This test is made in the same manner as the test without crystal in paragraph 33 except for the following:

(1) Change the CRYSTAL SELECTIVITY control from OFF to the 4 position.

(2) Apply a 10,000 microvolt r-f signal at the test frequency given for the receiver under test in table of paragraph 33. Modulate the test signal 400 cps–30 percent.

b. The total band width shall be less than 5 kc.

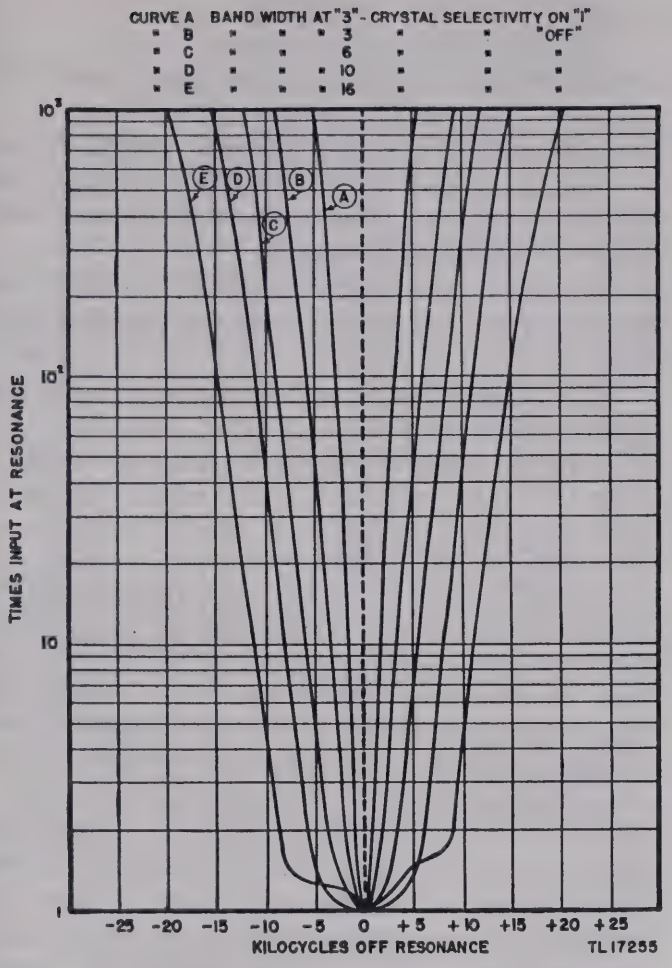


Figure 24. Selectivity chart.

35. Image Rejection Ratio

a. Minimum Requirements:

Test frequency in kilocycles	Rejection ratio
200	100,000 to 1
400	100,000 to 1
1,160	100,000 to 1
2,500	9,000 to 1
5,000	3,000 to 1
10,000	800 to 1
20,000	200 to 1
40,000	30 to 1

b. Test. (1) *Conditions.* Same as paragraph 27 except for following controls:

AVC-MANUAL on MAN.

AUDIO GAIN on Maximum.

(2) *Procedure.* Adjust the signal generator for the desired r-f test signal. Set the signal generator for a 5-microvolt signal, modulated at 400 cps. Tune the receiver to resonance at the test signal frequency. Adjust the receiver SENSITIVITY control for an output of 17.3 volts (500 mw). Increase the frequency of the test signal 930 kc (twice the i-f frequency). Multiply the original 5-microvolt signal generator output by the rejection ratio given in the table for a particular test frequency. For example, with a test frequency of 2,500 kc this would be 5 microvolts times 9,000 (9,000 to 1) or 45,000 microvolts. This increased signal generator output must not result in a receiver output of more than 17.3 volts (500 mw). Be sure that the receiver SENSITIVITY control is not disturbed after it has been set for a 17.3-volt output from a 5-microvolt input.

36. I-F Frequency Rejection Ratio

a. Minimum Requirements:

Test frequency in kilocycles	Rejection ratio
200 and down	100,000 to 1
400	100 to 1
540	100 to 1
1,250 and up	100,000 to 1

b. Test. (1) *Conditions.* Same as paragraph 27 except for the following control settings:

AVC-MANUAL on MAN.

AUDIO GAIN on maximum

(2) *Procedure.* Adjust the signal generator for the desired r-f test signal. Set the signal generator for a 5-microvolt signal, modulated at 400 cps. Tune the receiver to resonance at the test signal frequency. Adjust the receiver SENSITIVITY control for an output of 17.3 volts (500 mw). Tune the signal generator to 465 kc. Multiply the original 5-microvolt signal generator output by the rejection ratio for a particular test frequency. This increased signal generator output must not result in a receiver output of more than 17.3 volts (500 mw).

37. A-V-C Characteristic

a. Condition. Same as paragraph 27.

b. Test. (1) Apply a 5-microvolt, 2.5-mc r-f signal, modulated at 400 cps, through the 100-ohm dummy antenna of the receiver and tune the receiver to resonance.

(2) Adjust AUDIO GAIN for a 10-volt output.

(3) Increase the input signal from 5 to 50,000 microvolts.

(4) The output should not increase to more than 50 volts.

38. Power Output with Modulation (to Speaker)

a. Conditions. Same as paragraph 27, with the exception of the following settings:

AVC-MANUAL on MAN.

SENSITIVITY on maximum
AUDIO GAIN on maximum

b. TEST. Apply a 1,000-microvolt, 2.5-mc r-f signal, modulated at 400 cps, through the 100-ohm dummy antenna to the receiver. The voltage output should not be less than 77 volts.

39. Power Output, C-W Operation (to Speaker)

a. CONDITIONS. Same as paragraph 27, with the exception of the following control settings:

AVC-MANUAL on MAN.
AUDIO GAIN on maximum
MOD-CW on CW

b. TEST. (1) Apply a 1,000-microvolt, 2.5-mc r-f signal, modulated at 400 cps, through the 100-ohm dummy antenna to the receiver and tune the receiver to resonance.

(2) Adjust the BEAT OSCILLATOR control to the plus 1 or minus 1 position (approximately 1,000-cycle tone).

(3) Adjust the SENSITIVITY control for maximum output.

(4) The output should not be less than 54 volts.

40. Power Output at Phone Jack

a. CONDITIONS. (1) Same as paragraph 27, except for the following control settings:

AVC-MANUAL on MAN.
AUDIO GAIN on maximum

(2) Measure the output at the phone terminals across an 8,000-ohm resistive load.

b. TEST. (1) Apply a 1,000-microvolt, 2.5-mc r-f signal, modulated at 400 cps, through the 100-ohm dummy antenna to the receiver and tune the receiver to resonance.

(2) Adjust the SENSITIVITY control for an output of 17.3 volts across the 600-ohm output.

(3) Measure the voltage developed across the 8,000-ohm load.

(4) The output should be at least 8.3 volts.

41. Operational Test

The radio receiver should be given an operational test utilizing its regular power supply. The operational test is one to ascertain that the unit is properly functioning. It is a listening test on received signals from a radio transmitter. Signals received by the set under test should be clear and intelligible. Extraneous noises, intermittent, or microphonic conditions should not be present when the set under test is either tapped several times with a padded mallet to simulate vibration, or is operated on a vibrating table. See paragraph 16 for other details of operational test.

SECTION VIII
INDIVIDUAL STAGE AND CIRCUIT REPAIR DATA

42. General

a. Purpose of Data. The material in this section is presented as an aid in quickly tracing trouble to a specific component part after it has been localized to a particular stage by signal substitution, signal tracing, or other means outlined in the foregoing sections of this manual. The circuit features of each stage are described and differences in the component parts of various models indicated. Voltage and resistance measurements and a schematic and parts list for each individual stage are included to provide a handy and ready reference for repairs and part replacement at the point at which trouble is finally located.

b. Voltage and Resistance Measurements. (1) All voltage and resistance measurements given in this section are to be obtained with receiver controls set as shown below.

Control	Setting
SENSITIVITY	0
AUDIO-GAIN	0
SENSITROL-MOD-CW	CW
SEND-REC	REC
LIMITER	ON
AVC-MANUAL	MANUAL

(2) All resistance measurements are made between terminals and chassis.

(3) Terminals 1 and 2 of all sockets are at zero potential with respect to the chassis.

(4) All voltage readings shown are based on an a-c line voltage, exactly equal to the primary tap on the power transformer.

(5) All d-c readings are based on the use of a meter with a resistance of 1,000 ohms per volt.

(6) A tolerance of ± 10 percent from values given is acceptable.

c. Parts List Function Number. Although the function of each component part and its placement on the schematic diagram for each of the subject receivers is so nearly identical that the same schematic can be used for all models, there are differences in the electrical value of some component parts due to differences in frequency coverages and differences in the mechanical construction of a few parts. To enable the repairman to take full advantage of this similarity of function and schematic, a column has been added to each individual stage parts list headed *Function No.* All component parts performing the same function in various receivers have been given a function number which remains the same for each receiver. The use of the function number column provides the repairman with instant and complete information regarding the differences among various models. It also provides a link between commercial super pro receivers and their Signal Corps equivalents (table I) which permits the use of this manual for repairing and overhauling super pro receivers, many of which are used by the Signal Corps but do not have official nomenclature.

43. First R-F Stage VI

a. Circuit Features. The antenna is coupled to the grid of VI through an input transformer with an untuned primary and a tuned secondary. There is an electrostatic shield between the primary and secondary to prevent capacitive coupling between the antenna circuit and any part of the tuned secondary. This arrangement results in substantially pure inductive coupling only, and permits full advantage to be taken of a balanced transmission line lead-in. The impedance of the input circuit averages approximately 100 ohms throughout the tuning range of the receiver.

b. Circuit Differences. (1) The B positive plate supply is series fed to the plates of VI in Radio Receivers BC–779–( ) and BC–1004–( ).

(2) The B positive plate supply is shunt fed to the plates of VI in Radio Receiver BC–794–( ) through r-f choke L35. It is coupled to the tuned circuit of the second radio frequency through the fixed capacitor C57. This arrangement keeps plate voltage off the tuned impedance interstage coupling circuits of the 20-40 mc band.

(3) The differences in electrical values due to varying frequency bands are readily apparent in the parts list.

c. Parts List for First R-f Stage V1.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
1	C1A	C1A	C1A	----	CAPACITOR: variable; air; integral part of tuning unit.	1st r-f grid tuning.
2	C2A	C2A	C2A	----	CAPACITOR: variable; air; integral part of tuning unit.	1st r-f grid band spread.
3	C3	C3	C3	3D9620	CAPACITOR: fixed; mica; 600 mmf ± 10%; 300 vdcw.	1st r-f grid coupling.
4	C4	C4	C4	3DA10–124	CAPACITOR: fixed; paper; 10,000 mmf ± 20%—10%; 600 vdcw	1st r-f grid by pass.
5	C5	C5	C5	3DA10–124	CAPACITOR: fixed; paper; 10,000 mmf ± 20%—10%; 600 vdcw	1st r-f screen bypass.
6	C59	C59	C59	----	CAPACITOR: variable; mica trimmer; 3–30 mmf; part of L6.	Trimmer for L6.
7	C60	C60	C60	----	CAPACITOR: variable; mica trimmer; 3–30 mmf; part of L7.	Trimmer for L7.
8	C61	--	C61	----	CAPACITOR: variable; mica trimmer; 3–30 mmf; part of L8.	Trimmer for L8.
8	--	C98	--	----	CAPACITOR: variable; mica trimmer; 4–36 mmf; part of L48.	Trimmer for L48.
9	C62	--	--	----	CAPACITOR: variable; mica trimmer; 5–40 mmf; part of L9.	Trimmer for L9.
9	--	C61	--	----	CAPACITOR: variable; mica trimmer; 3–30 mmf; part of L8.	Trimmer for L8.
9	--	--	C90	----	CAPACITOR: variable; mica trimmer; 3–30 mmf; part of L39.	Trimmer for L39.
10	C63	--	--	----	CAPACITOR: variable; mica trimmer; 5–40 mmf; part of L10.	Trimmer for L10.
10	--	C102	--	----	CAPACITOR: variable; mica trimmer; 3–30 mmf; part of L52.	Trimmer for L52.
10	--	--	C91	----	CAPACITOR: variable; mica trimmer; 3–30 mmf; part of L40.	Trimmer for L40.
11	E1	E1	E1	2C4528.7/34	BOARD, terminal: two screw terminals marked "A."	Antenna connections.
12	L1	L1	L1	2C4528.3/10–3	COIL, 1st r-f: antenna primary; 10–20 mc.	Antenna coupling.
13	L2	L2	L2	2C4528.3/10–2	COIL, 1st r-f: antenna primary; 5–10 mc.	Antenna coupling.
14	L3	--	L3	2C4528.3/10–1	COIL, 1st r-f: antenna primary; 2.5–5 mc.	Antenna coupling.
14	--	L47	--	2C4528.3/10–3	COIL, 1st r-f: antenna primary; 20–40 mc.	Antenna coupling.
15	L4	--	--	2C4528.3/10–5	COIL, 1st r-f: antenna primary; 200–400 kc.	Antenna coupling.
15	--	L3	--	2C4528.3/10–1	COIL, 1st r-f: antenna primary; 2.5–5 mc.	Antenna coupling.
15	--	--	L37	2C4528.7/10–7	COIL, 1st r-f: antenna primary; 1,160–2,500 kc.	Antenna coupling.
16	L5	--	--	2C4528.3/10–4	COIL, 1st r-f: antenna primary; 100–200 kc.	Antenna coupling.
16	--	L37	--	2C4528.7/10–7	COIL, 1st r-f: antenna primary; 1,160–2,500 kc.	Antenna coupling.
16	--	--	L38	2C4528.7/10–6	COIL, 1st r-f: antenna primary; 540–1,160 kc.	Antenna coupling.

c. PARTS LIST FOR FIRST R-F STAGE V1.—*Continued*

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
17	L6	L6	L6	2C4528.3/8–4	COIL, 1st r-f: grid; 10–20 mc.	1st r-f grid input.
18	L7	L7	L7	2C4528.3/8–3	COIL, 1st r-f: grid; 5–10 mc.	1st r-f grid input.
19	L8	--	L8	2C4528.3/8–2	COIL, 1st r-f: grid; 2.5–5 mc.	1st r-f grid input.
19	--	L48	--	2C4528.8/8–2	COIL, 1st r-f: grid; 20–40 mc.	1st r-f grid input.
20	L9	--	--	2C4528.3/8–6	COIL, 1st r-f: grid; 200–400 kc.	1st r-f grid input.
20	--	L8	--	2C4528.3/8–2	COIL, 1st r-f: grid; 2.5–5 mc.	1st r-f grid input.
20	--	--	L39	2C4528.7/8–8	COIL, 1st r-f: grid; 1,160–2,500 kc.	1st r-f grid input.
21	L10	--	--	2C4528.3/8–5	COIL, 1st r-f: grid; 100–200 kc.	1st r-f grid input.
21	--	L52	--	2C4528.8/8–1	COIL, 1st r-f: grid; 1,250–2,500 kc.	1st r-f grid input.
21	--	--	L40	2C4528.7/8–7	COIL, 1st r-f: grid; 540–1,160 kc.	1st r-f grid input.
22	R1	R1	R1	3Z6750–17	RESISTOR, fixed: metalized; 500,000 ohms ± 10%; 1/3 w.	1st r-f grid coupling.
23	R2	R2	R2	3Z6610–7	RESISTOR, fixed: metalized; 10,000 ohms ± 10%; 1/2 w.	1st r-f grid filter.
24	R3	R3	R3	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms ± 10%; 1/2 w.	1st r-f screen filter.
25	SW1A	SW1A	SW1A	----	SWITCH, rotary: 10-pole, 5 positions, 5 sections; integral part of tuning unit.	Antenna switching.
26	SW1B	SW1B	SW1B	----	SWITCH, rotary: 10-pole, 5 positions, 5 sections; integral part of tuning unit.	1st r-f grid switching.
27	V–1	V–1	V–1	2T86	TUBE, electron: JAN–6K7.	1st r-f amplifier.
28	X–1	X–1	X–1	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V1.
29	--	C57	--	3K2030133	CAPACITOR, fixed: silver mica; 300 mmf, ± 2%; 500 vdcw.	1st r-f plate coupling.
30	--	L35	--	----	COIL, choke: 5 pi universal; ceramic core 2.1 mh; 35 ohms dc resistance.	1st r-f plate coupling.

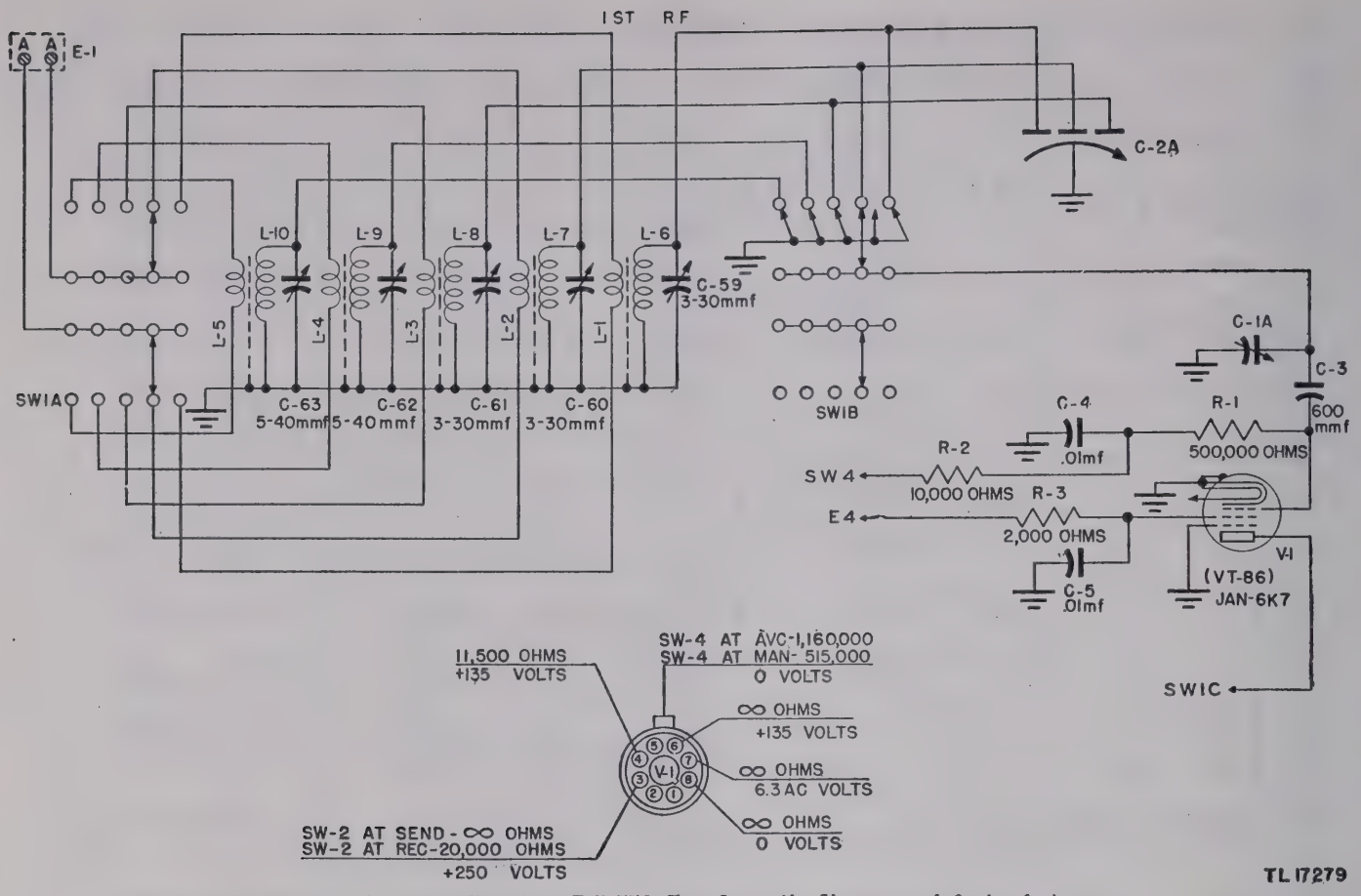


Figure 25. Radio Receiver BC–779–B, schematic diagram of first r-f stage.

1st RF

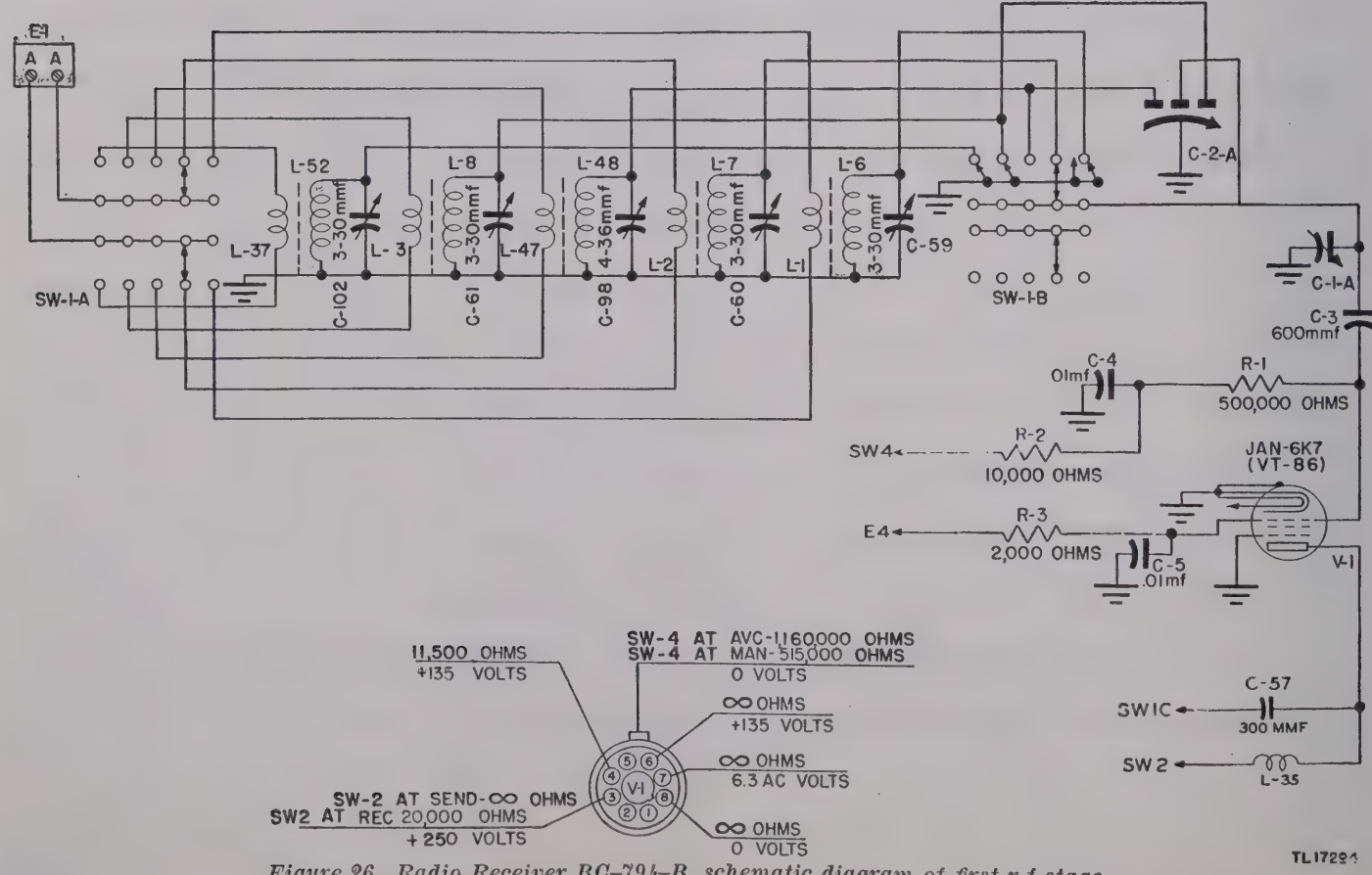


Figure 26. Radio Receiver BC–794–B, schematic diagram of first r-f stage.

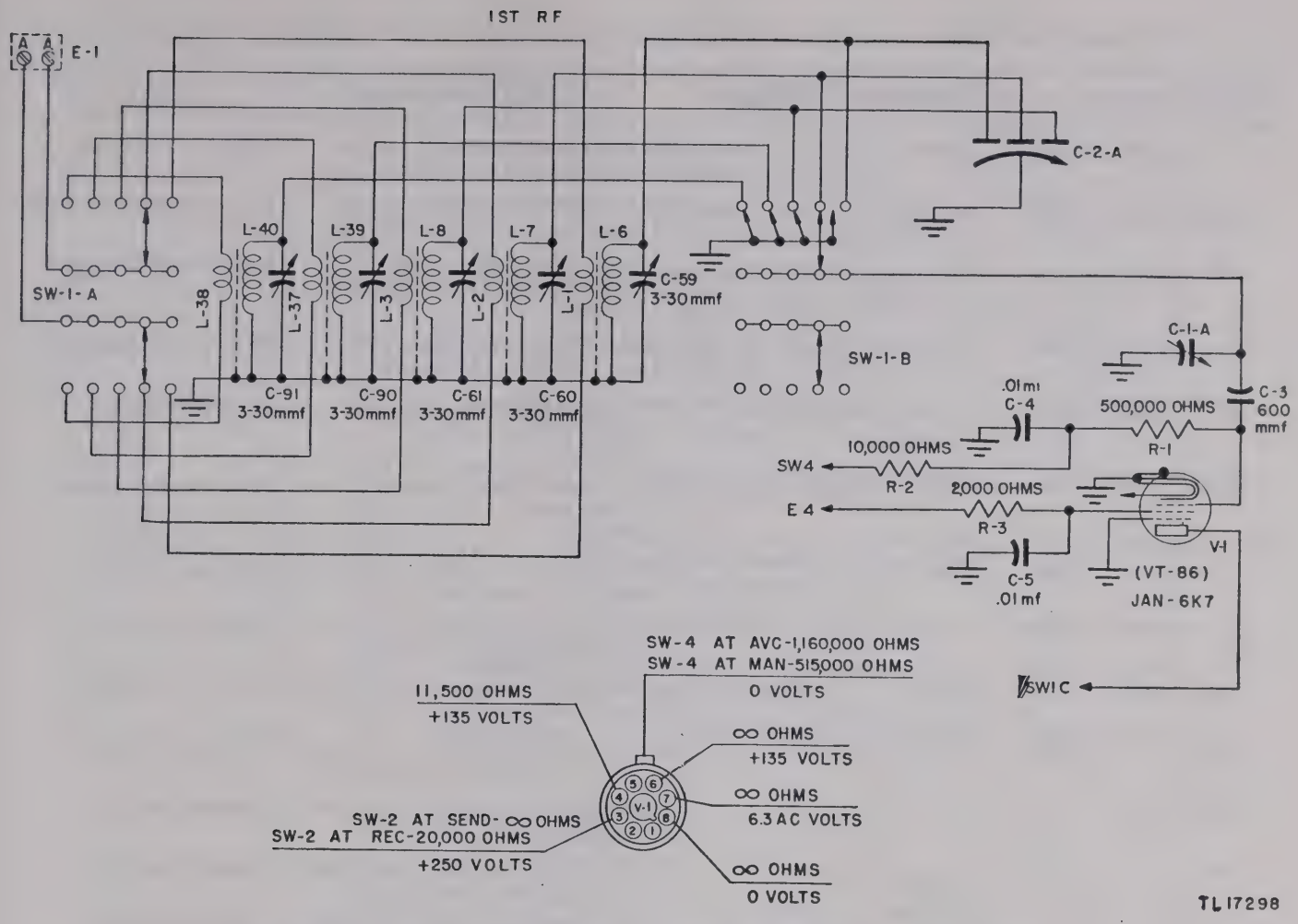


Figure 27. Radio Receiver BC–1004–C, schematic diagram of first r-f stage.

44. Second R-F Stage V2

The subject receivers differ in the following respects:

a. Plate Decoupling Filter. A plate decoupling filter consisting of resistor R4 and capacitor C6 is present in Radio Receivers BC–779–B and BC–1004–C but is not included in the BC–794–B.

b. Series Damping Resistor. A series damping resistor (R57) is inserted in the secondary coil (L42) of the 540- to 1,160-kc band in Radio Receiver BC–1004–C. This resistor reduces the Q of the r-f transformer and provides less sideband cutting, especially at the low-frequency end of the band. Resistor R57 is not present in Radio Receivers BC–779–B and BC–794–B.

c. Coupling Stages. In Radio Receiver BC–794–B, this stage is coupled to the preceding stage through capacitor C57 and coil L49 on the 20- to 40-mc band. All other frequency bands of the subject receivers use conventional r-f transformer coupling.

d. Parts List for Second R-f Stage V2.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
31	C1B	C1B	C1B	----	CAPACITOR, variable: air, integral part of tuning unit.	2d r-f grid tuning.
32	C2B	C2B	C2B	----	CAPACITOR, variable: air, integral part of tuning unit.	2d r-f grid band spread.
33	C6	--	C6	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20%—10%; 600 vdcw.	Plate decoupling filter.
34	C7	C7	C7	3D9620	CAPACITOR, fixed: mica; 600 mmf ± 10%; 300 vdcw.	2d r-f grid coupling.
35	C8	C8	C8	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20%—10%; 600 vdcw.	2d r-f grid bypass.
36	C9	C9	C9	3DA10–194	CAPACITOR, fixed: paper; 10,000 mmf + 20%—10%; 600 vdcw.	2d r-f screen bypass.
37	C64	C64	C64	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L11.	Trimmer for L11.
38	C65	C65	C65	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L12.	Trimmer for L12.
39	C66	--	C66	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L13.	Trimmer for L13.
39	--	C99	--	----	CAPACITOR, variable: mica trimmer; 4–16 mmf; part of L49	Trimmer for L49
40	C67	--	--	----	CAPACITOR, variable: mica trimmer; 5–40 mmf; part of L14.	Trimmer for L14.
40	--	C66	--	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L13.	Trimmer for L13.
40	--	--	C92	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L41.	Trimmer for L41.
41	C68	--	--	----	CAPACITOR, variable: mica trimmer; 5–30 mmf; part of L15.	Trimmer for L15.
41	--	C103	--	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L53.	Trimmer for L53.
41	--	--	C93	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L42.	Trimmer for L42.
42	L11	L11	L11	2C4528.3/5–4	COIL, 2d r-f: transformer; 10–20 mc.	2d r-f grid input.
43	L12	L12	L12	2C4528.3/5–3	COIL, 2d r-f: transformer; 5–10 mc.	2d r-f grid input.
44	L13	--	L13	2C4528.3/5–2	COIL, 2d r-f: transformer; 2.5–5 mc.	2d r-f grid input.
44	--	L49	--	2C4528.8/5–2	COIL, 2d r-f: transformer; 20–40 mc.	2d r-f grid input.
45	L14	--	--	2C4528.3/5–6	COIL, 2d r-f: transformer; 200–400 kc.	2d r-f grid input.
45	--	L13	--	2C4528.3/5–2	COIL, 2d r-f: transformer; 2.5–5 mc.	2d r-f grid input.
45	--	--	L41	2C4528.7/5–8	COIL, 2d r-f: transformer; 1,160–2,500 kc.	2d r-f grid input.
46	L15	--	--	2C4528.3/5–5	COIL, 2d r-f: transformer; 100–200 kc.	2d r-f grid input.
46	--	L53	--	2C4528.8/5–1	COIL, 2d r-f: transformer; 1,250–2,500 kc.	2d r-f grid input.
46	--	--	L42	2C4528.7/5–7	COIL, 2d r-f: transformer; 540–1,160 kc.	2d r-f grid input.

d. PARTS LIST FOR SECOND R-F STAGE V2.—*Continued*

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
47	--	L35	--	3C308–4	COIL, radio, rf: choke; 2.1 mh; 35 ohms d-c resistance.	Plate r-f choke.
48	R4	--	R4	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms ± 10%; 1/2 w.	Plate decoupling filter.
49	R5	R5	R5	3Z6750	RESISTOR, fixed: metalized; 500,000 ohms ± 10%; 1/3 w.	Grid coupling.
50	R6	R6	R6	3Z6610–7	RESISTOR, fixed: metalized; 10,000 ohms ± 10%; 1/2 w.	Grid filter.
51	R7	R7	R7	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms ± 10%; 1/2 w.	Screen filter.
52	--	--	R57	3Z6002–1	RESISTOR, fixed: wire-wound; 20 ohms ± 10%; 1/2w.	L42 selectivity control.
53	SW1C	SW1C	SW1C	----	SWITCH, rotary; 10 pole, 5 positions, 5 sections; integral part of tuning unit.	1st r-f plate, 2d r-f grid.
54	V2	V2	V2	2T86	TUBE, electron: JAN–6K7.	2d r-f amplifier.
55	X2	X2	X2	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V2.
56	--	C57	--	3K2030133	CAPACITOR, fixed: silver mica; 300 mmf ± 2%; 500 vdcw.	Plate coupling.

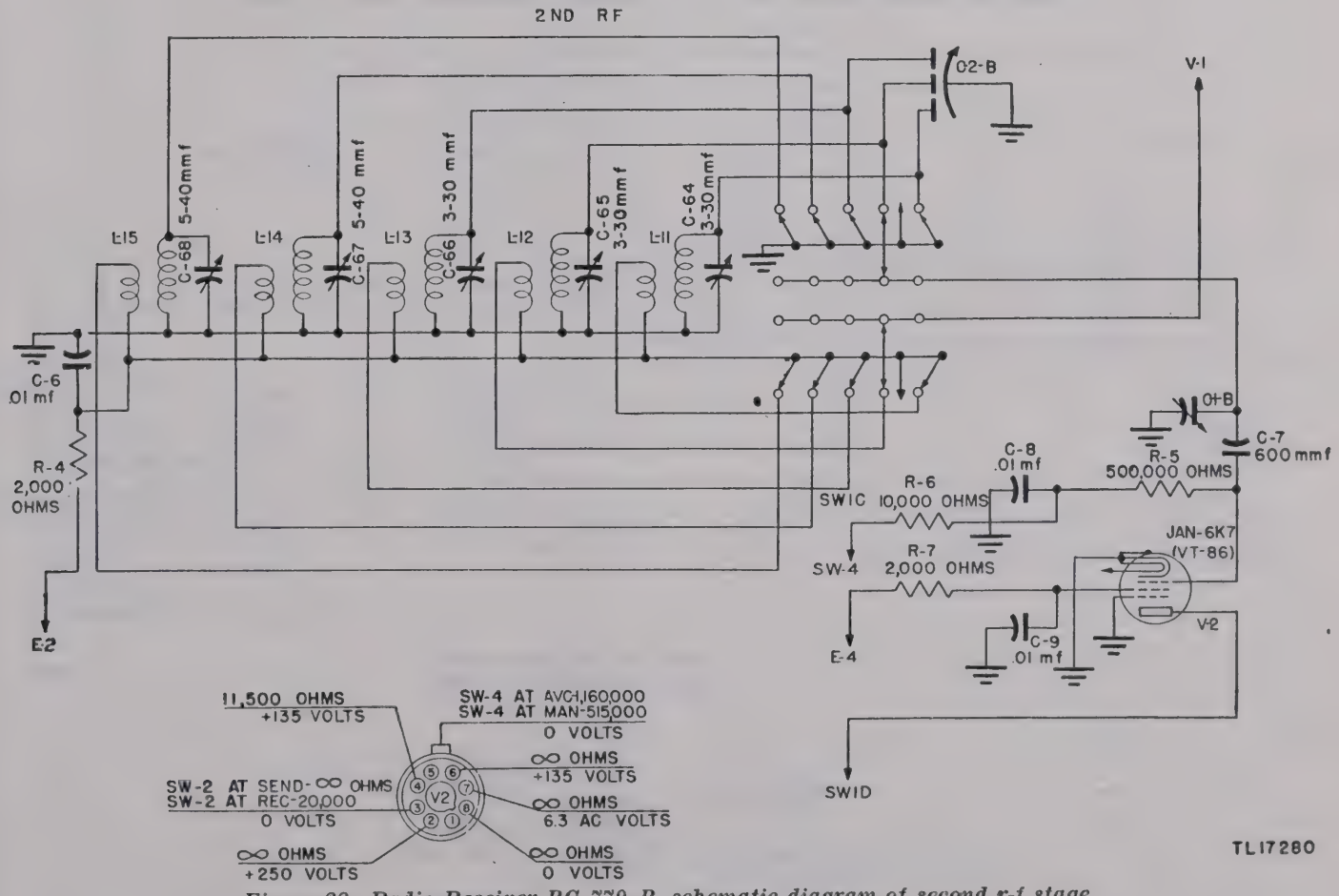


Figure 28. Radio Receiver BC–779–B, schematic diagram of second r-f stage.

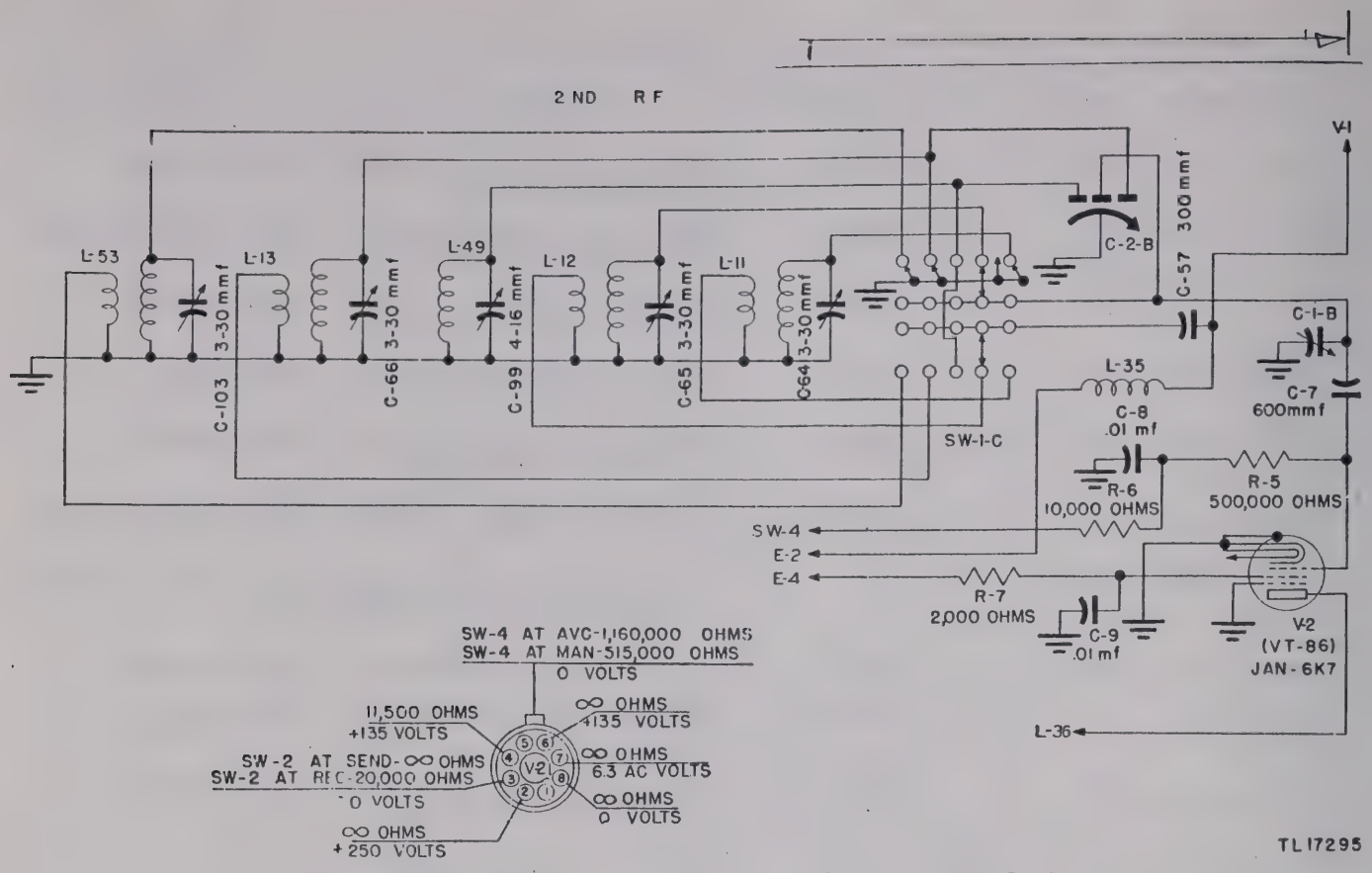


Figure 29. Radio Receiver BC–794–B, schematic diagram of second r-f stage.

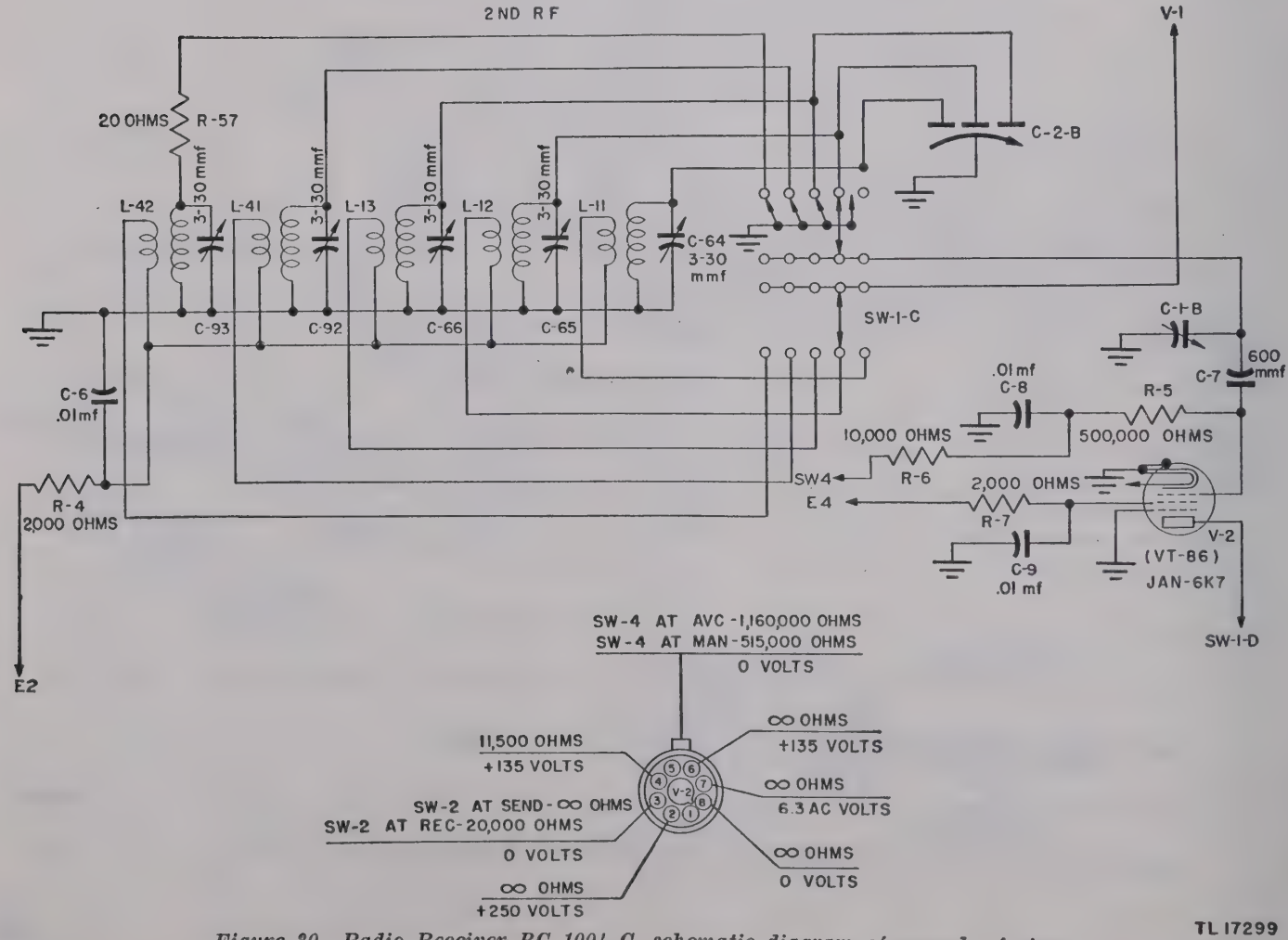


Figure 30. Radio Receiver BC–1004–C, schematic diagram of second r-f stage.

45. First Detector Stage V3

a. Circuit Features. The injection grid is coupled to the h-f oscillator cathode. The desired i-f voltage (465 kc) is selected and amplified by the tuned resonant circuit consisting of capacitor C21 and transformer L26.

b. Circuit Differences. (1) A plate decoupling filter consisting of resistor R8 and capacitor C10 is present in Radio Receivers BC–779–B and BC–1004–C but is not included in the BC–794–B.

(2) A series damping resistor R58 is inserted in the secondary coil (L42) of the 540- to 1,160-kc band in Radio Receiver BC–1004–C. This resistor reduces the Q of the r-f transformer and provides less side-band cutting, especially at the low-frequency end of the band. Resistor R58 is not present in Radio Receivers BC–779–B and BC–794–B.

(3) In Radio Receiver BC–794–B, this stage is coupled to the preceding stage through capacitor C58 and coil L50 on the 20–40 mc band. All other frequency bands of the subject receivers use conventional r-f transformer coupling.

c. Parts List for First Detector Stage V3.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
57	C1C	C1C	C1C	----	CAPACITOR, variable: air; integral part of tuning unit.	1st detector grid tuning.
58	C2C	C2C	C2C	----	CAPACITOR, variable: air; integral part of tuning unit.	1st detector grid tuning.
59	C10	--	C10	3DA10–194	CAPACITOR, fixed: paper; 10,000 mmf + 20%—10%; 600 vdcw.	Plate decoupling filter.
60	C11	C11	C11	3D9620	CAPACITOR, fixed: mica; 600 mmf + 10%; 300 vdcw.	Signal grid coupling.
61	C12	C12	C12	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20%—10%; 600 vdcw.	Signal grid bypass.
62	C13	C13	C13	3K2091032	CAPACITOR, fixed: silver mica; 95 mmf + 2%; 500 vdcw.	Oscillator grid coupling.
63	C14	C14	C14	3DA1D–124	CAPACITOR, fixed: paper; 10,000 mmf + 20%—10%; 600 vdcw.	Screen bypass.
64	--	C58	--	3K2030133	CAPACITOR, fixed: silver mica; 300 mmf + 2%; 500 vdcw.	Plate coupling.
65	C69	C69	C69	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L16.	Trimmer for L16.
66	C70	C70	C70	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L17.	Trimmer for L17.
67	C71	--	C71	----	CAPACITOR, variable: mica trimmer; 3–30 mmf; part of L18.	Trimmer for L18.
68	--	C100	--	----	CAPACITOR, variable: mica trimmer; 4–16 mmf; part of L50.	Trimmer for L50.
69	C72	--	--	----	CAPACITOR, variable: mica trimmer 5–40 mmf; part of L19.	Trimmer for L19.
69	--	C71	--	----	CAPACITOR, variable: mica trimmer 3–30 mmf; part of L18.	Trimmer for L18.
69	--	--	C94	----	CAPACITOR, variable: mica trimmer 3–30 mmf; part of L43.	Trimmer for L43.
70	C73	--	--	----	CAPACITOR, variable: mica trimmer 5–40 mmf; part of L20.	Trimmer for L20.
70	--	C104	--	----	CAPACITOR, variable: mica trimmer 3–30 mmf; part of L54.	Trimmer for L54.
70	--	--	C95	----	CAPACITOR, variable: mica trimmer 3–30 mmf; part of L44.	Trimmer for L44.
71	L16	L16	L16	2C4528.3/5–4	COIL ASSEMBLY: transformer; 10–20 mc.	1st detector grid input.
72	L17	L17	L17	2C4528.3/5–3	COIL ASSEMBLY: transformer; 5–10 mc.	1st detector grid input.
73	L18	--	L18	2C4528.3/5–2	COIL ASSEMBLY: transformer; 2.5–5 mc.	1st detector grid input.
74	--	L50	--	2C4528.8/5–2	COIL ASSEMBLY: transformer; 20–40 mc.	1st detector grid input.
75	L19	--	--	2C4528.3/5–6	COIL ASSEMBLY: transformer; 200–400 kc.	1st detector grid input.
75	--	L18	--	2C4528.3/5–2	COIL ASSEMBLY: transformer; 2.5–5 mc.	1st detector grid input.
75	--	--	L43	2C4528.7/5–8	COIL ASSEMBLY: transformer; 1,160–2,500 kc.	1st detector grid input.
76	L20	--	--	2C4528.3/5–5	COIL ASSEMBLY: transformer; 100–200 kc.	1st detector grid input.

c. PARTS LIST FOR FIRST DETECTOR STAGE V3.—*Continued*

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
76	--	L54	--	2C4528.8/5–1	COIL ASSEMBLY: transformer; 1,250–2,500 kc.	1st detector grid input.
76	--	--	L44	2C4528.7/5–7	COIL ASSEMBLY: transformer; 540–1,160 kc.	1st detector grid input.
77	--	L36	--	----	COIL, r-f choke: 2.1 mh; 35 omhs dc resistance.	Plate r-f choke.
78	R8	--	--	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms + 10%; 1/2 w.	Plate decoupling filte.
79	R9	R9	R9	3Z6750–17	RESISTOR, fixed: metalized; 500,000 ohms + 10%; 1/3 w.	Signal grid coupling.
80	R10	R10	R10	3Z6610–7	RESISTOR, fixed: metalized; 10,000 ohms + 10%; 1/2 w.	Signal grid filter.
81	R11	R11	R11	3Z6650–77	RESISTOR, fixed: metalized; 50,000 ohms + 10%; 1/3 w.	Oscillator grid coupling.
82	R12	R12	R12	3Z6625–3	RESISTOR, fixed: metalized; 25,000 ohms + 10%; 2 w.	Screen filter.
83	SW1D	SW1D	SW1D	-----	SWITCH, rotary: 10 pole, 5 position, 5 section.	2d r-f plate, 1st detector grid.
84	--	--	R58	3Z6002–1	RESISTOR, fixed: wire-wound; 20 ohms + 10%; 1/2 w.	Selectivity control for L44.
85	V3	V3	V3	2T87	TUBE, electron: JAN–6L7.	1st detector.
86	X3	X3	X3	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V3.

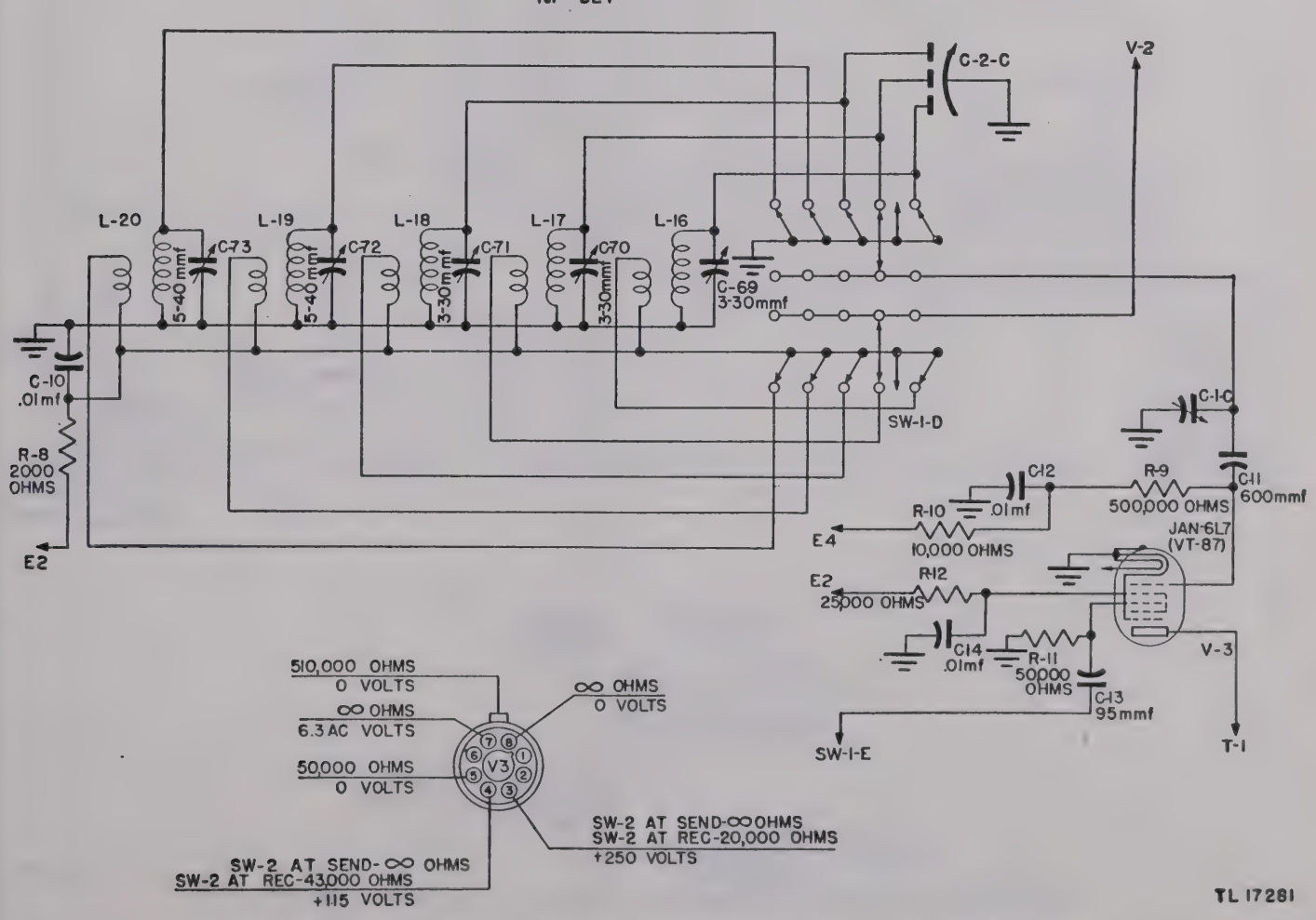


Figure 31. Radio Receiver BC–779–B, schematic diagram of first detector stage.

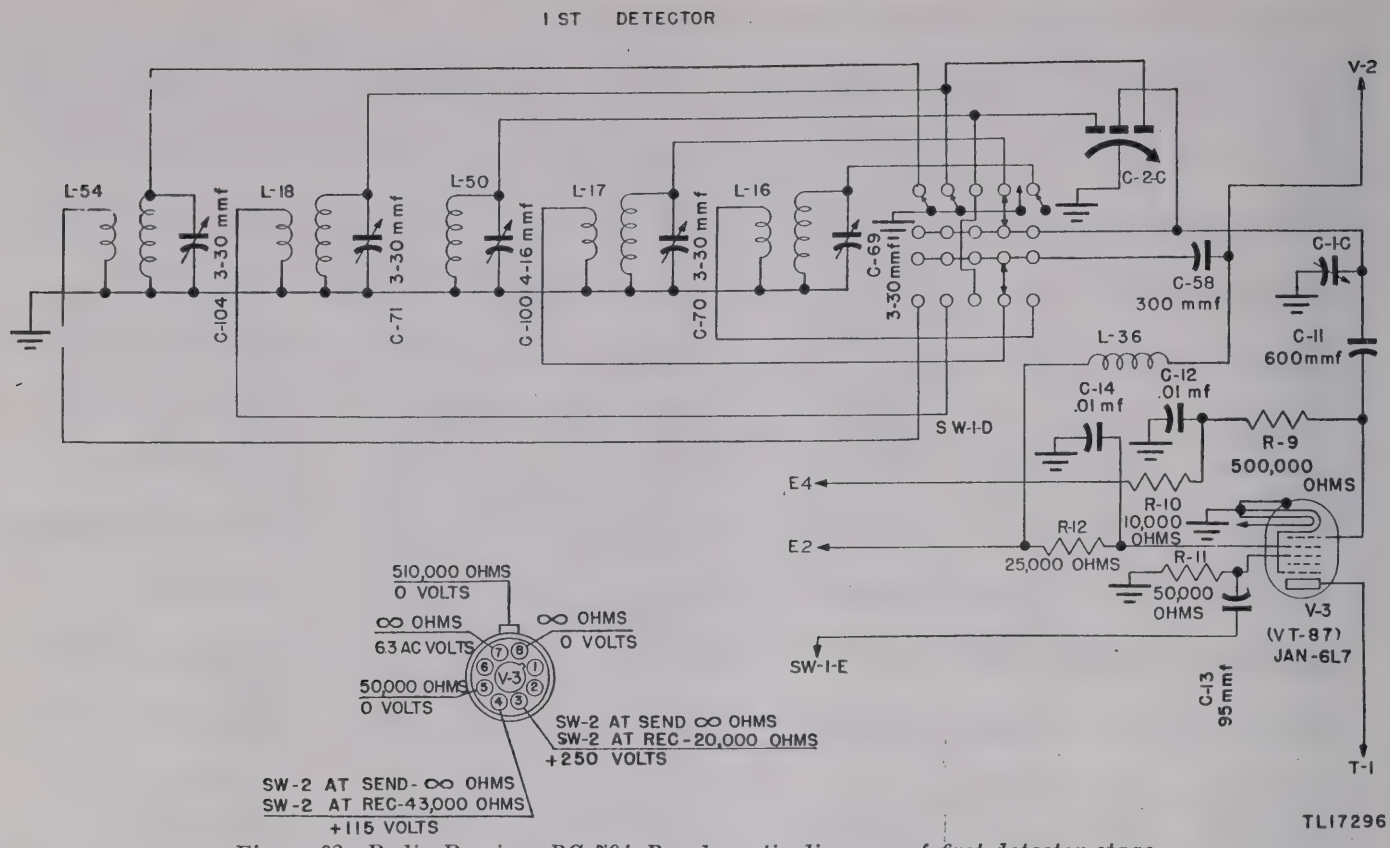


Figure 32. Radio Receiver BC–794–B, schematic diagram of first detector stage.

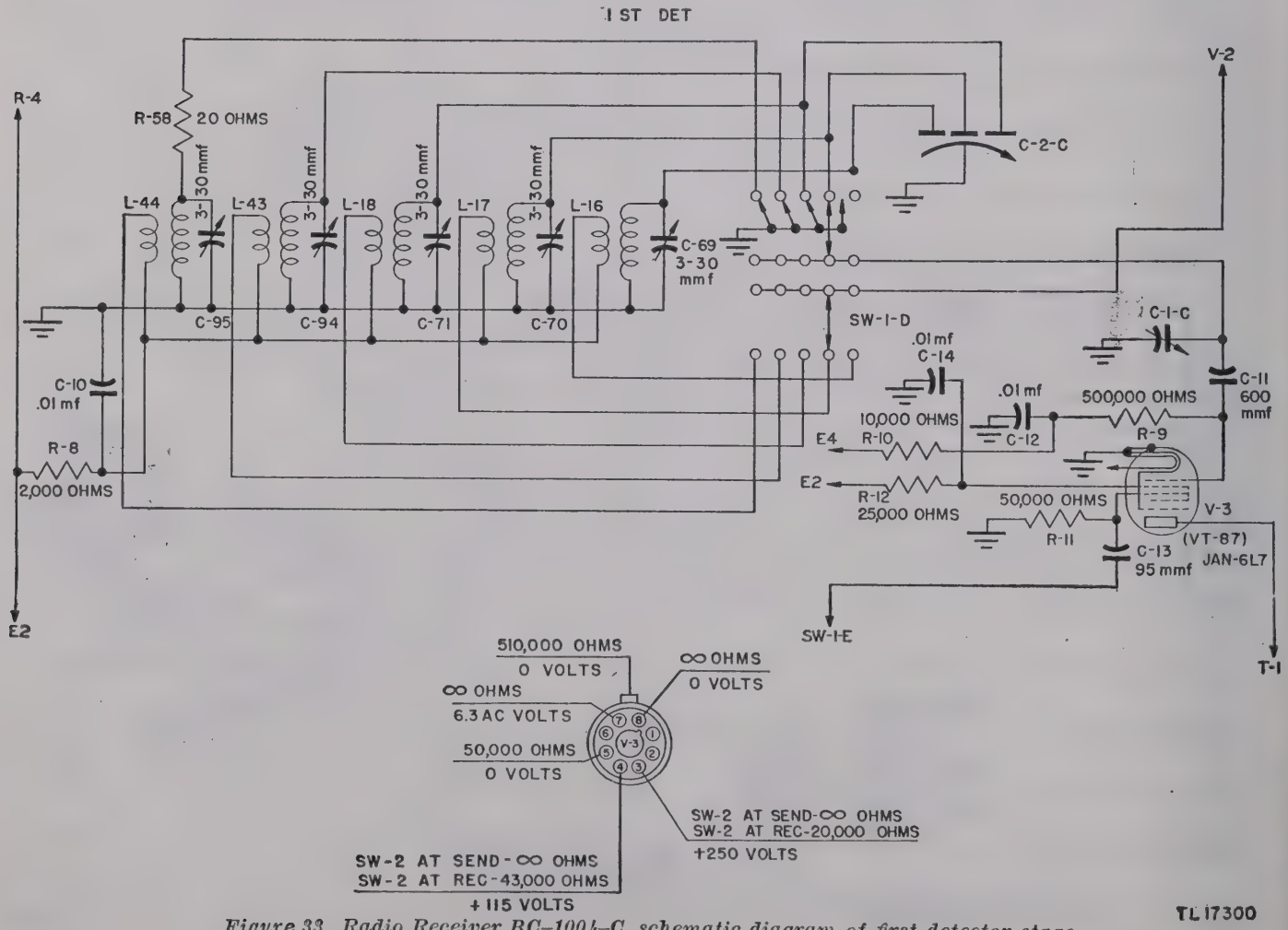


Figure 33. Radio Receiver BC–1004–C, schematic diagram of first detector stage.

46. High-Frequency Oscillator Stage V4

a. Circuit Features. The oscillator circuit is a modified Hartley circuit with tube V4 connected as a triode. The plate, screen, and suppressor grids are tied together and bypassed to ground through capacitor C16. The cathode is tapped into the oscillator tuning coil well down on the windings. The oscillator output is taken from the cathode and applied to the injection grid of the first detector V3. This method minimizes oscillator frequency changes caused by reaction from the first detector signal grid circuit.

b. Circuit Differences. (1) No fixed series padding capacitor is used on the 20- to 40-mc band of Radio Receiver BC–794–B. A fixed series padder is used on all other bands and on all bands of Radio Receivers BC–779–B and BC–1004–C.

(2) Proper oscillator tracking is accomplished on the 100- to 200-kc and 200- to 400-kc bands of the BC–779–B with the use of variable padding capacitors C87 and C86. These two capacitors are not present on any other frequency bands.

c. Voltage Measurements. The voltage measurements taken at pins 3, 4, and 5 of tube V4 vary widely with different tubes and dial settings. A variation of 20 percent is acceptable for these voltages.

d. Parts List for High-Frequency Oscillator V4.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
87	C1D	C1D	C1D	----	CAPACITOR, variable: air; integral part of tuning unit.	Oscillator grid tuning.
88	C2D	C2D	C2D	----	CAPACITOR, variable: air; integral part of tuning unit.	Oscillator grid band spread.
89	C15	C15	C15	2C4528.7	CAPACITOR, fixed: silver mica; 50 mmf ± 2%; 500 vdcw.	Oscillator grid coupling.
90	C16	C16	C16	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20% — 10%; 600 vdcw.	Plate bypass.
91	C74	C74	C74	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L21.	Trimmer for L21.
92	C75	C75	C75	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L22.	Trimmer for L22.
93	C76	C76	C76	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L23.	Trimmer for L23.
93	--	C101	--	----	CAPACITOR, variable: air trimmer; 4–25 mmf; part of L51.	Trimmer for L51.
94	C77	--	--	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L45.	Trimmer for L45.
94	--	C76	--	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L23.	Trimmer for L23.
94	--	--	C96	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L45.	Trimmer for L45.
95	C78	--	--	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L25.	Trimmer for L25.
95	--	C105	--	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L55.	Trimmer for L55.
95	--	--	C97	----	CAPACITOR, variable: air trimmer; 4–28 mmf; part of L46.	Trimmer for L46.
96	C79	C79	C79	----	CAPACITOR, fixed: metal clad "toothpick"; 4,800 mmf ± 5%; 500 vdcw.	Series padder for L21.
97	C80	C80	C80	----	CAPACITOR, fixed: metal clad "toothpick"; 2,400 mmf ± 5%; 500 vdcw.	Series padder for L22.
98	C81	--	C81	----	CAPACITOR, fixed: metal clad "toothpick"; 1,220 mmf ± 5%; 500 vdcw.	Series padder for L23.
99	C82	--	--	----	CAPACITOR, fixed: silver mica; 122 mmf ± 2%; 500 vdcw.	Fixed series padder for L24.
99	--	C81	--	----	CAPACITOR, fixed: metal clad "toothpick"; 1,220 mmf ± 5%; 500 vdcw.	Series padder for L23.
99	--	--	C88	----	CAPACITOR, fixed: silver mica; 275 mmf ± 2%; 500 vdcw.	Series padder for L45.
100	C83	--	--	----	CAPACITOR, fixed: silver mica; 70 mmf ± 2%; 500 vdcw.	Fixed series padder for L25.
100	--	C88	--	----	CAPACITOR, fixed: silver mica; 522 mmf ± 2%; 500 vdcw.	Series padder for L45.
100	--	--	C89	----	CAPACITOR, fixed: silver mica; 275 mmf ± 2%; 500 vdcw.	Series padder for L46.
101	C84	--	--	----	CAPACITOR, fixed: silver mica; 36 mmf ± 3%; 500 vdcw.	Fixed parallel trimmer for L24.
102	C85	--	--	----	CAPACITOR, fixed: silver mica; 61 mmf ± 2%; 500 vdcw.	Fixed parallel trimmer for L25.

d. Parts List for High-Frequency Oscillator V4.—*Continued*

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
103	C86	--	--	----	CAPACITOR, variable: air: 4–44 mmf; part of L24.	Variable series padder for L24.
104	C87	--	--	----	CAPACITOR, variable: air; 4–44 mmf; part of L25.	Variable series padder for L25.
105	L21	L21	L21	2C4528.3/9–4	COIL ASSEMBLY: transformer; 10–20 mc.	Oscillator grid input.
106	L22	L22	L22	2C4528.3/9–3	COIL ASSEMBLY: transformer; 5–10 mc.	Oscillator grid input.
107	L23	--	L23	2C4528.3/9–2	COIL ASSEMBLY: transformer; 2.5–5 mc.	Oscillator grid input.
107	--	L51	--	2C4528.8/9–2	COIL ASSEMBLY: transformer; 20–40 mc.	Oscillator grid input.
108	L24	--	--	2C4528.3/9–6	COIL ASSEMBLY: transformer; 200–400 kc.	Oscillator grid input.
108	--	L23	--	2C4528.3/9–2	COIL ASSEMBLY: transformer; 2.5–5 mc.	Oscillator grid input.
108	--	--	L45	2C4528.7/9–8	COIL ASSEMBLY: transformer; 1,160–2,500 kc.	Oscillator grid input.
109	L25	--	--	2C4528.3/9–5	COIL ASSEMBLY: transformer; 100–200 kc.	Oscillator grid input.
109	--	L55	--	2C4528.8/9–1	COIL ASSEMBLY: transformer; 1,250–2,500 kc.	Oscillator grid input.
109	--	--	L46	2C4528.7/9–7	COIL ASSEMBLY: transformer; 540–1,160 kc.	Oscillator grid input.
110	R13	R13	R13	3Z6650–77	RESISTOR, fixed: metalized; 50,000 ohms ± 10%: 1/3 w.	Oscillator grid coupling.
111	R14	R14	R14	3Z6612–2	RESISTOR, fixed: metalized; 12,000 ohms ± 10%: 2 w.	Oscillator plate filter.
112	SW1E	SW1E	SW1E	----	SWITCH, rotary: 10 pole, 5 position, 5 section.	Oscillator grid and cathode.
113	V4	V4	V4	2T86	TUBE, electron: JAN 6J7.	H-f oscillator.
114	X4	X4	X4	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V4.

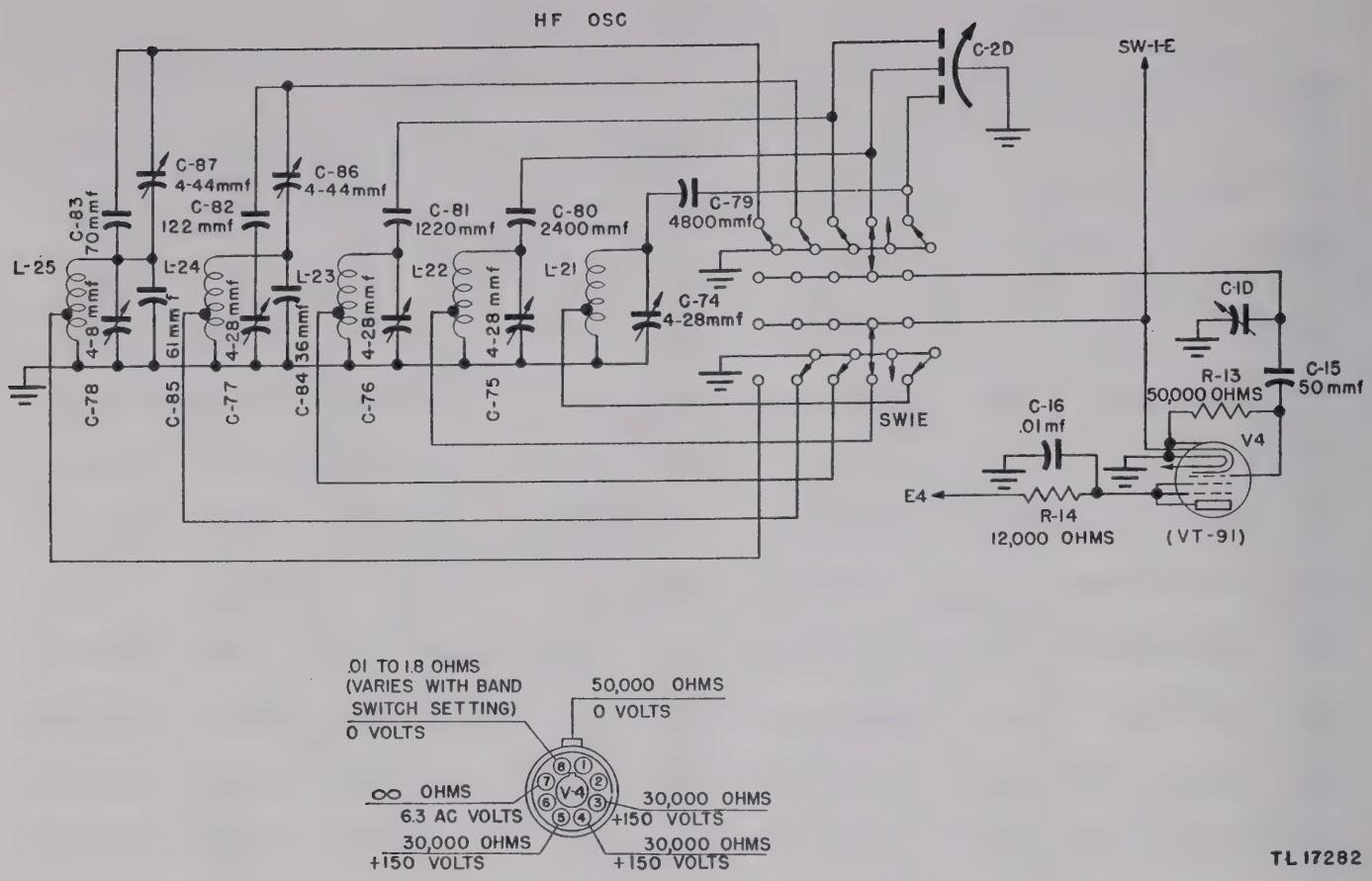


Figure 34. Radio Receiver BC–779–B, schematic diagram of high-frequency oscillator stage.

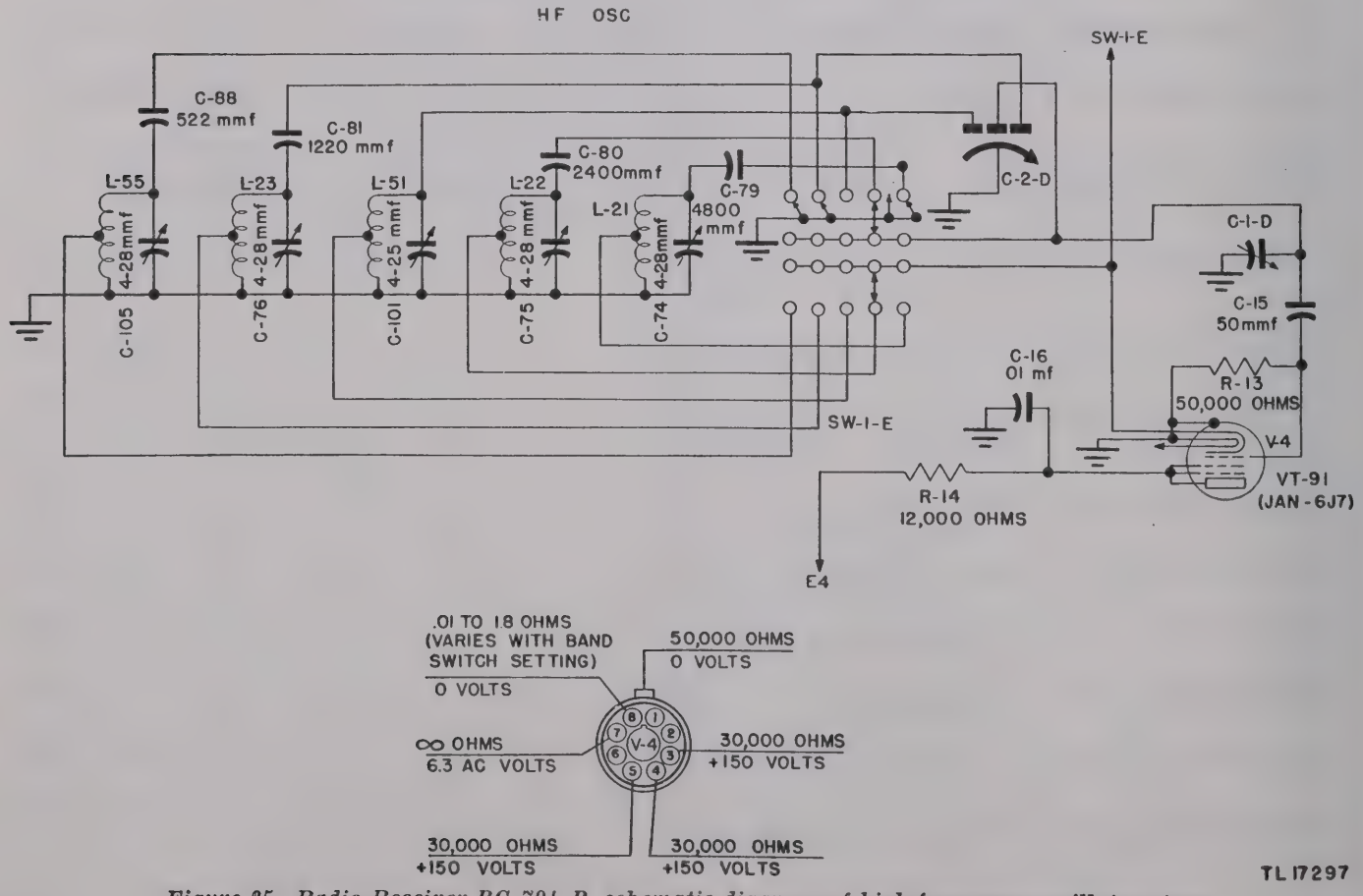


Figure 35. Radio Receiver BC–794–B, schematic diagram of high-frequency oscillator stage.

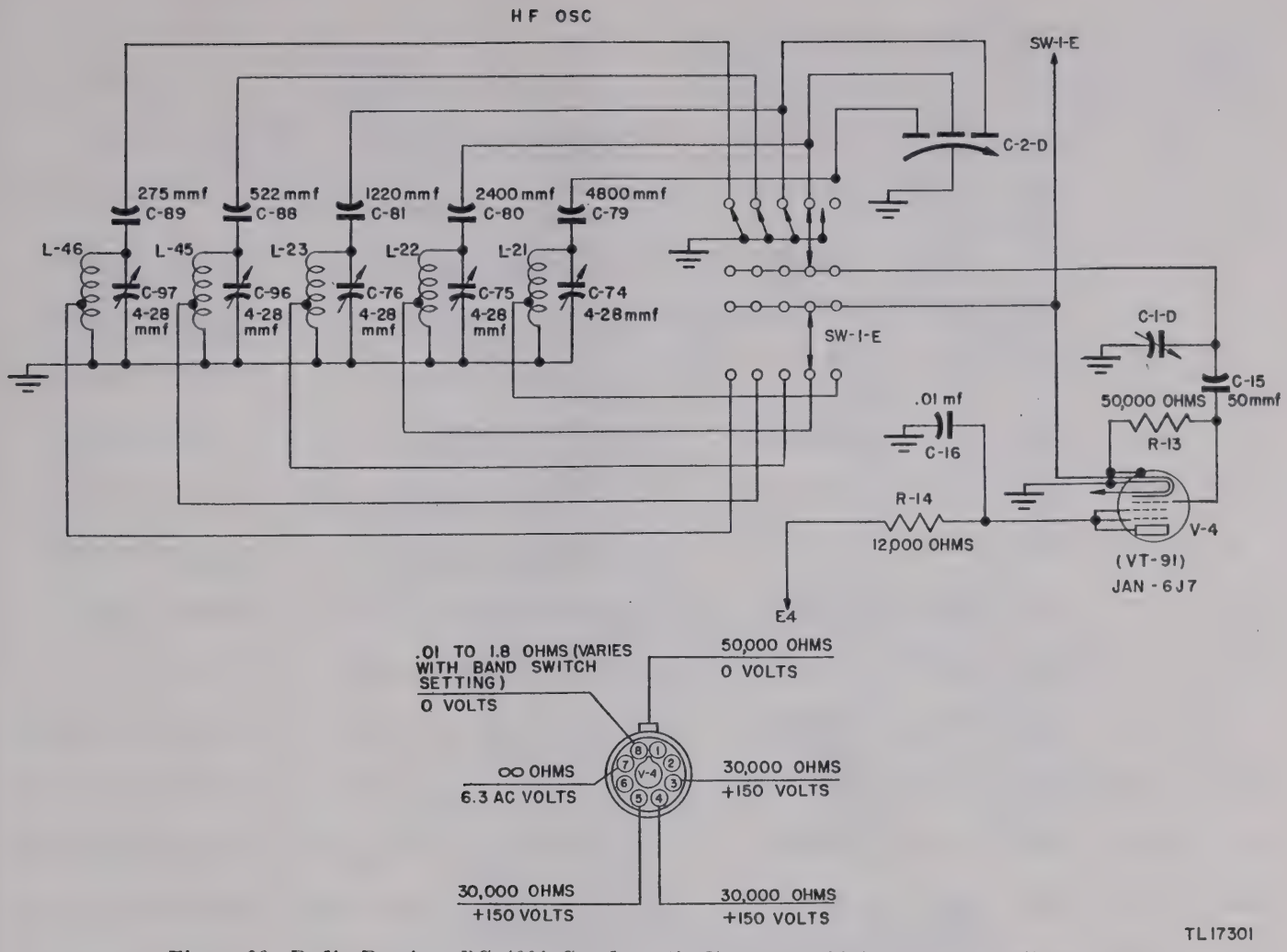


Figure 36. Radio Receiver BC–1004–C, schematic diagram of high-frequency oscillator stage.

47. First I-F Stage V5

a. Circuit Features. The quartz crystal filter (Y1) couples the first detector to the first amplifier (V5). When the CRYSTAL SELECTIVITY switch (57) is set at the OFF position, the crystal (Y1) is short-circuited and signal voltages present in the secondary of the first i-f coil (L26) are imposed directly upon the control grid of the first i-f amplifier tube. At any other setting of switch 57, the quartz crystal is in the circuit. It acts as an extremely high-impedance, series-tuned circuit, interposed between the secondary of coil L26 and the first i-f grid circuit (L27 and C33). This high impedance constitutes the load into which the crystal works. Selectivity is varied by altering the impedance of the parallel tuned circuit. This is accomplished by adding resistance R42, R43, R44, and R45 in series with coil L27 and capacitor C33. As this series resistance is increased, the over-all selectivity of the filter is also increased. The first i-f amplifier tube is a pentode of the remote cut-off, or supercontrol type.

b. Circuit Differences. There are no circuit differences among the subject receivers. They are all identical in this stage.

c. Parts List for First I-f Stage V5.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
115	T1	T1	T1	2C4528.7/63	TRANSFORMER ASSEMBLY: variable selectivity.	Varying selectivity.
116	C21	C21	C21	3K2012133	CAPACITOR, fixed: silver mica; 120 mmf ± 2%; 500 vdcw.	1st detector plate tuning.
117	C22	C22	C22	3D9100–64	CAPACITOR, fixed: silver mica; 100 mmf ± 5%; 500 vdcw.	Crystal filter plate coil center tapping.
118	C23	C23	C23	3D9100–64	CAPACITOR, fixed: silver mica; 100 mmf ± 5%; 500 vdcw.	Crystal filter plate coil center tapping.
119	C32	C32	C32	----	CAPACITOR, variable: air; 2–6 mmf.	Crystal filter phasing.
120	C33	C33	C33	3D9025–2	CAPACITOR, fixed: silver mica; 85 mmf ± 2%; 500 vdcw.	1st i-f grid tuning.
121	C34	C34	C34	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20 % — 10%; 600 vdcw.	1st i-f grid bypass.
122	C35	C35	C35	----	CAPACITOR, variable: mica trimmer; 1.5 mmf–5 mmf.	Crystal filter phasing trimmer.
123	L26	L26	L26	----	COIL, i-f transformer: iron dust core.	1st detector plate.
124	L27	L27	L27	----	COIL, i-f transformer: iron dust core.	1st i-f grid.
125	R42	R42	R42	3Z6002–3	RESISTOR, fixed: wire-wound; 25 ohms ± 10%; 1/2 w.	Crystal selectivity control.
126	R43	R43	R43	3Z6005–13	RESISTOR, fixed: wire-wound; 50 ohms ± 10%; 1/2 w.	Crystal selectivity control.
127	R44	R44	R44	3Z6030–8	RESISTOR, fixed: metalized; 300 ohms ± 5%; 1/2w.	Crystal selectivity control.
128	R45	R45	R45	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms ± 10%; 1/2 w.	Crystal selectivity control.
129	SW7	SW7	SW7	3Z9903–5	SWITCH, wafer: 6 positions.	Crystal filter selectivity.
130	Y1	Y1	Y1	----	CRYSTAL UNIT, quartz; resonator type; 465 kc ± 5 kc.	Variable selectivity filter.
131	C18A	C18A	C18A	3DA50–51	CAPACITOR, fixed: paper in metal case; 3×0.05 mf + 20% — 10%; 600 vdcw.	1st detector plate bypass.
132	C18C	C18C	C18C	3DA50–51	CAPACITOR, fixed: paper in metal case; 3×0.05 mf + 20% — 10%; 600 vdcw.	1st i-f screen bypass.
133	R15	R15	R15	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms + 10%; 1/2 w.	1st detector plate filter.
134	R16	R16	R16	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms ± 10%; 1/2 w.	1st i-f screen filter.
135	V5	V5	V5	2T86	TUBE, electron: JAN–6K7.	1st i-f amplifier.
136	X5	X5	X5	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V5.

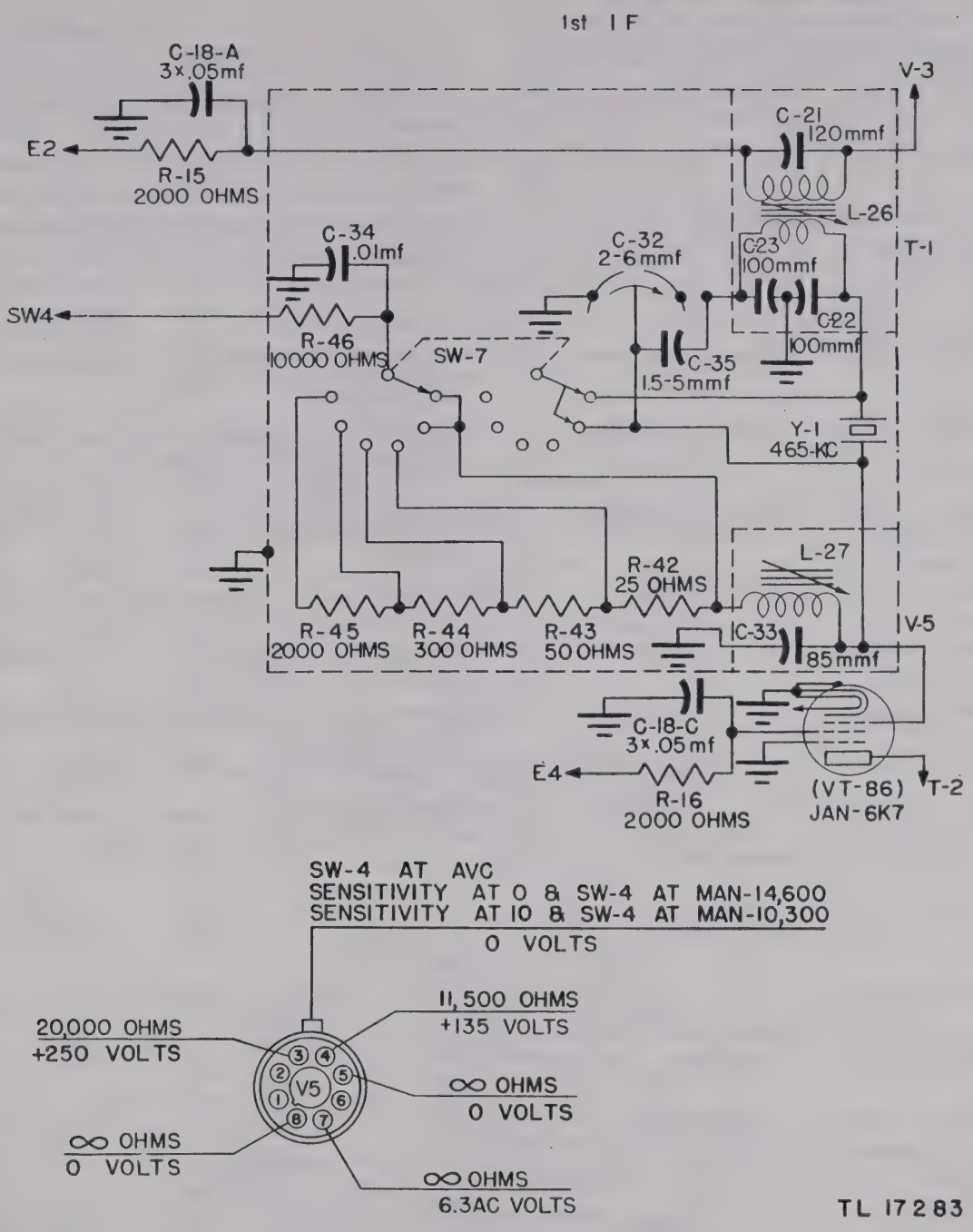


Figure 37. Radio Receivers BC-779-B, BC-794-B, and BC-1004-C, schematic diagram of first i-f stage.

48. Second I-F Stage V6

a. Circuit Features. The second i-f transformer (T2) has a tuned primary as well as a tuned secondary. The secondary coil is fixed in position, while the primary coil is mounted on slide rods and can be moved back and forth with respect to the secondary, thus changing the degree of inductive coupling. They are tuned by means of air-dielectric variable capacitors C36 and C37. The grid coil L29 is tapped for connection to the control grid of the second i-f amplifier tube V6. This tap is located approximately 1/10 of the total turns up from the low potential end of the coil.

b. Circuit Differences. The second i-f stage V6 is identical in all the subject receivers.

c. PARTS LIST FOR SECOND R-F STAGE V6.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
137	T2	T2	T2	2C4528.7/5–1	TRANSFORMER ASSEMBLY: variable selectivity.	Varying selectivity.
138	C36	C36	C36	----	CAPACITOR, variable: air; 100 mmf.	1st i-f plate tuning.
139	C37	C37	C37	----	CAPACITOR, variable: air; 100 mmf.	2d i-f grid tuning.
140	L28	L28	L28	----	COIL, transformer:	1st i-f plate.
141	L29	L29	L29	----	COIL, transformer:	2d i-f plate.
142	C19A	C19A	C19A	3DA50–51	CAPACITOR, fixed: paper in metal case 3 × 0.05 mf + 20% —10%; 600 vdcw.	1st i-f plate bypass.
143	C19B	C19B	C19B	3DA50–51	CAPACITOR, fixed: paper in metal case 3 × 0.05 mf + 20% —10%; 600 vdcw.	2d i-f grid bypass.
144	C19C	C19C	C19C	3DA50–51	CAPACITOR, fixed: paper in metal case mf + 20% —10%; 600 vdcw.	2d i-f grid screen bypass.
145	R17	R17	R17	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms + 10%; 1/2 w.	1st i-f plate filter.
146	R18	R18	R18	3Z6610–7	RESISTOR, fixed: metalized; 10,000 ohms + 10%; 1/2 w.	2d i-f grid filter.
147	R20	R20	R20	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms + 10%; 1/2 w.	2d i-f screen filter.
148	V6	V6	V6	2T117	TUBE, electron: JAN–6SK7.	2d i-f amplifier.
149	X6	X6	X6	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V6.

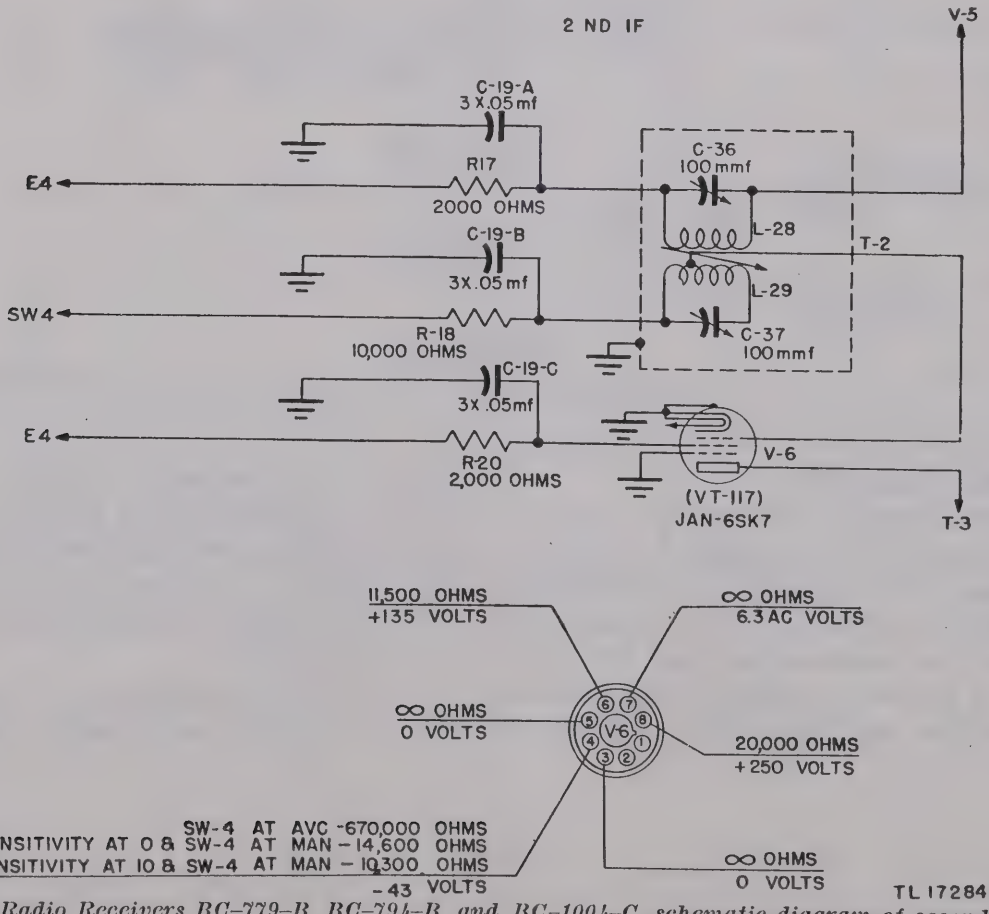


Figure 38. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of second i-f stage.

49. Third I-F Stage V7

a. Circuit Features. The third i-f transformer (T3) has a tuned primary as well as a tuned secondary. The secondary coil is fixed in position, while the primary coil is mounted on slide rods and can be moved back and forth with respect to the secondary, thus changing the degree of inductive coupling. They are tuned by means of air-dielectric variable capacitors C38 and C39. The grid coil L31 is tapped for connection to the control grid of the third i-f amplifier tube V6. This tap is located approximately 1/10 of the total turns up from the low potential end of the coil.

b. Circuit Differences. The third i-f stage V7 is identical in all the subject receivers.

c. Parts List for Third R-F Stage V7.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
150	T3	T3	T3	2C4528.7/5–1	TRANSFORMER ASSEMBLY:	Varying selectivity.
151	C38	C38	C38	----	CAPACITOR, variable: air; 100 mmf.	2d i-f plate tuning.
152	C39	C39	C39	----	CAPACITOR, variable: air; 100 mmf.	3d i-f grid tuning.
153	L30	L30	L30	----	COIL, transformer.	2d i-f plate.
154	L31	L31	L31	----	COIL, transformer.	3d i-f grid.
155	C20A	C20A	C20A	3DA50–51	CAPACITOR, fixed: paper in metal case 3 × 0.05 mf + 20% —10%; 600 vdcw.	2d i-f plate bypass.
156	C20B	C20B	C20B	3DA50–51	CAPACITOR, fixed: paper in metal case 3 × 0.05 mf + 20% —10%; 600 vdcw.	3d i-f grid bypass.
157	C20C	C20C	C20C	3DA50–51	CAPACITOR, fixed: paper in metal case 3 × 0.05 mf + 20% —10%; 600 vdcw.	3d i-f screen bypass.
158	R21	R21	R21	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms + 10%; 1/2 w.	2d i-f plate filter.
159	R22	R22	R22	3Z6610–7	RESISTOR, fixed: metalized; 10,000 ohms + 10%; 1/2 w.	3d i-f grid filter.
160	R23	R23	R23	3Z6650–15	RESISTOR, fixed: metalized; 50,000 ohms + 10%; 1/2 w.	3d i-f screen filter.
161	V7	V7	V7	2T117	TUBE, electron: JAN–6SK7.	3d i-f amplifier.
162	X7	X7	X7	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V7.

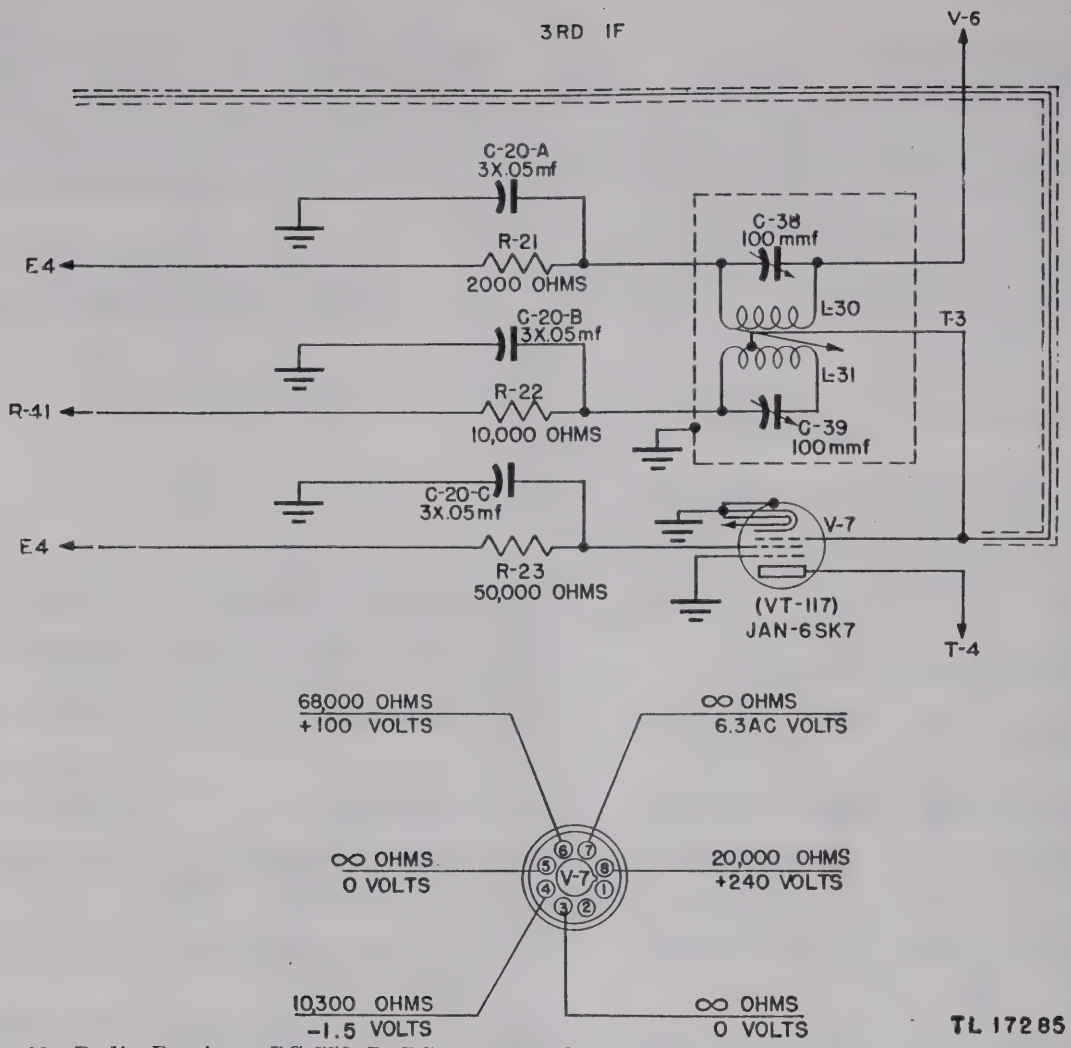


Figure 39. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of third i-f stage.

50. Second Detector Stage V8

a. Circuit Features. The second detector (V8) is a twin diode with both plates connected in parallel and likewise both cathodes. The i-f input is obtained from the untuned secondary of coil L32 in transformer T4, in the plate circuit of the third i-f amplifier V7. The diode load resistance total is 475,000 ohms and is divided into two approximately equal parts. One part, 250,000 ohms (R30), is placed between the parallel cathodes and the ground and is bypassed (for i-f) by a 50-mmf capacitor (C26). The other part, 225,000 ohms, is between the low potential end of the secondary and ground, and is made up of 100,000 ohms (R48), 75,000 ohms (R24), and 50,000 ohms (R25). The 100,000-ohm resistor (R48), together with two 50-mmf capacitors (C44 and C45), constitute a filter to prevent i-f voltages from reaching the 50,000-ohm resistor (R25) and the audio gain control (R26).

b. Circuit Differences. The second detector stage V8 is identical in all the subject receivers.

c. Parts List for Second Detector Stage V8.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
163	T4	T4	T4	2C4528.7/62	TRANSFORMER ASSEMBLY: fixed selectivity.	2d detector input.
164	C40	C40	C40	----	CAPACITOR, variable: air; 100 mmf.	3d i-f plate tuning.
165	C41	C41	C41	3D9005E5	CAPACITOR, fixed: mica; 5.5 mmf + 10%; 500 vdcw.	B-f oscillator coupling.
166	C42	C42	C42	3DA50–55	CAPACITOR, fixed: paper; 50,000 mmf + 20% —10%; 600 vdcw.	Noise limiter tuning.
167	C43	C43	C43	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20% —10%; 600 vdcw.	3d i-f plate bypass.
168	C44	C44	C44	2C4528.7/4–2	CAPACITOR, fixed: mica; 50 mmf + 10%; 500 vdcw.	2d detector r-f bypass.
169	C45	C45	C45	2C4528.7/4–2	CAPACITOR, fixed: mica; 50 mmf + 10%; 500 vdcw.	2d detector r-f bypass.
170	L32	L32	L32	----	COIL, transformer.	2d detector input.
171	R47	R47	R47	3Z4526	RESISTOR, fixed: metalized; 2,000 ohms + 10%; 1/2 w.	3d i-f plate filter.
172	R48	R48	R48	3Z6700–6	RESISTOR, fixed: metalized; 100,000 ohms + 10%; 1/2 w.	2d detector diode load.
173	R49	R49	R49	3Z6801–1	RESISTOR, fixed: metalized; 1 megohm + 10%; 1/2 w.	Noise limiter timing.
174	C26	C26	C26	2C4528–7/4–2	CAPACITOR, fixed: mica; 50 mmf + 10%; 500 vdcw.	2d detector cathode bypass.
175	R30	R30	R30	3Z6725–2	RESISTOR, fixed: metalized; 250,000 ohms + 10%; 1/2 w.	2d detector cathode biasing.
176	V8	V8	V8	2T90	TUBE, electron: JAN–6H6.	2d detector.
177	X8	X8	X8	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V8.

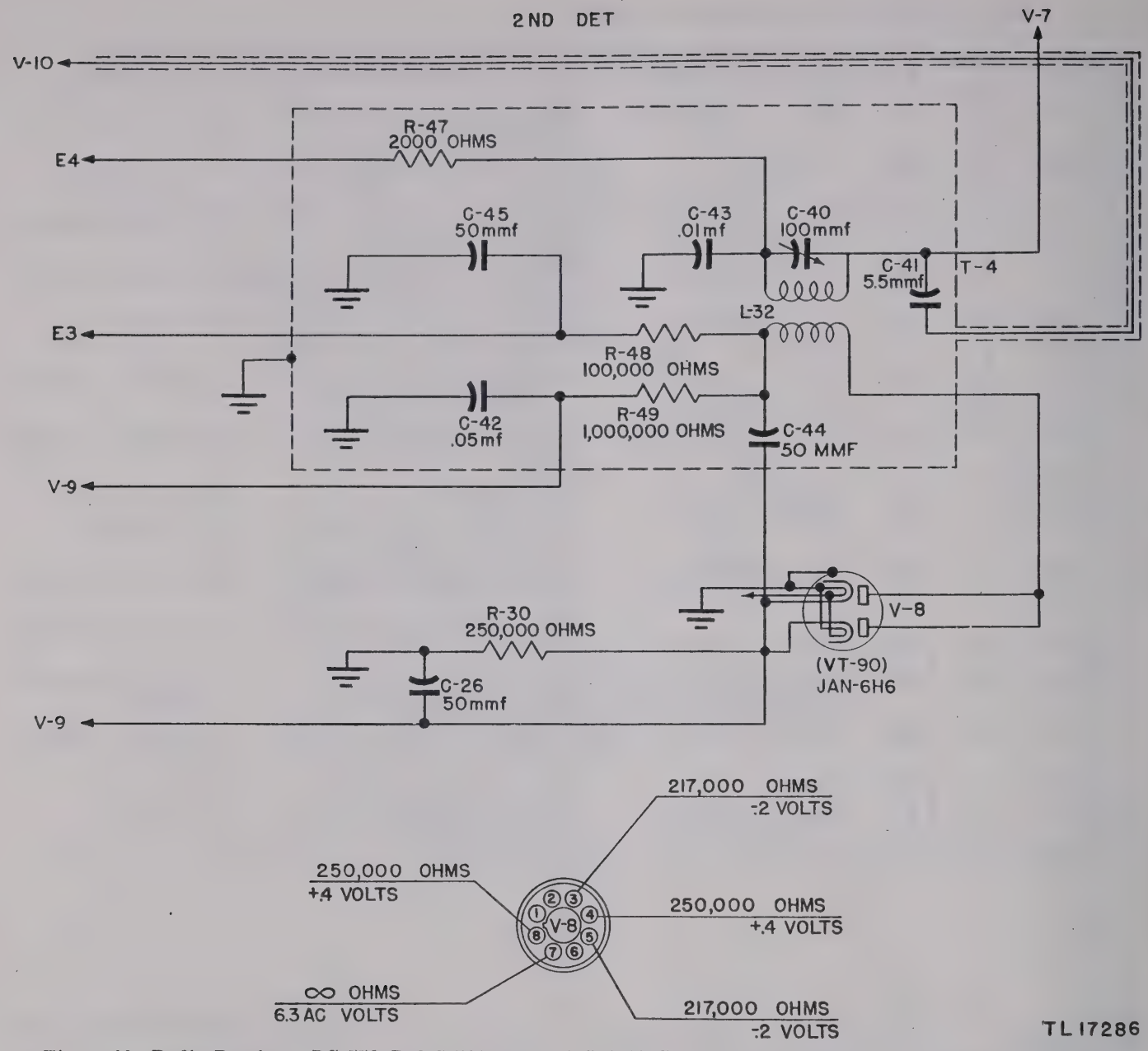


Figure 40. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of second detector stage.

51. Noise-Limiter Stage V9

a. Circuit Features. The limiter tube (V9) is a class B twin triode with its two grids and two plates connected in parallel to secure the lowest possible impedance. When the LIMITER switch (SW5) is closed, the relative potentials of cathodes, grids, and plates of V9 depend on the d-c current flowing in the load circuit of the second detector. The potential of the grids of V9 is controlled by the filter consisting of resistor R49 and capacitor C42. The time constant of this combination (1/20 sec) is long enough to prevent the grids of V9 from following the carrier variations due to normal modulation and yet short enough to follow the variations due to fading. This arrangement provides automatic adjustment of the noise-limiter circuit for widely different carrier levels at the second detector.

b. Circuit Differences. The noise limiter stage V9 is identical in all the subject receivers.

c. Parts List for Noise-limiter Stage V9.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
178	R24	R24	R24	3Z4541	RESISTOR, fixed: metalized: 75,000 ohms + 10%: 1/2 w.	2d detector diode load.
179	R25	R25	R25	3Z6650–10	RESISTOR, fixed: metalized: 50,000 ohms + 10%: 1/2 w.	2d detector diode load.
180	R31	R31	R31	2C4528.6/19	RESISTOR, fixed: wire-wound; 4 ohms + 10%; 5 w.	Noise limiting heater dropping.
181	SW5	SW5	SW5	2Z9900–3	SWITCH, rotary snap: SPST.	Noise limiter switch.
182	V9	V9	V9	2T96	TUBE, electron: JAN–6N7.	Noise limiter.
183	X9	X9	X9	2Z8795.12	SOCKET, tube: standard octal: molded bakelite.	Socket for V9.

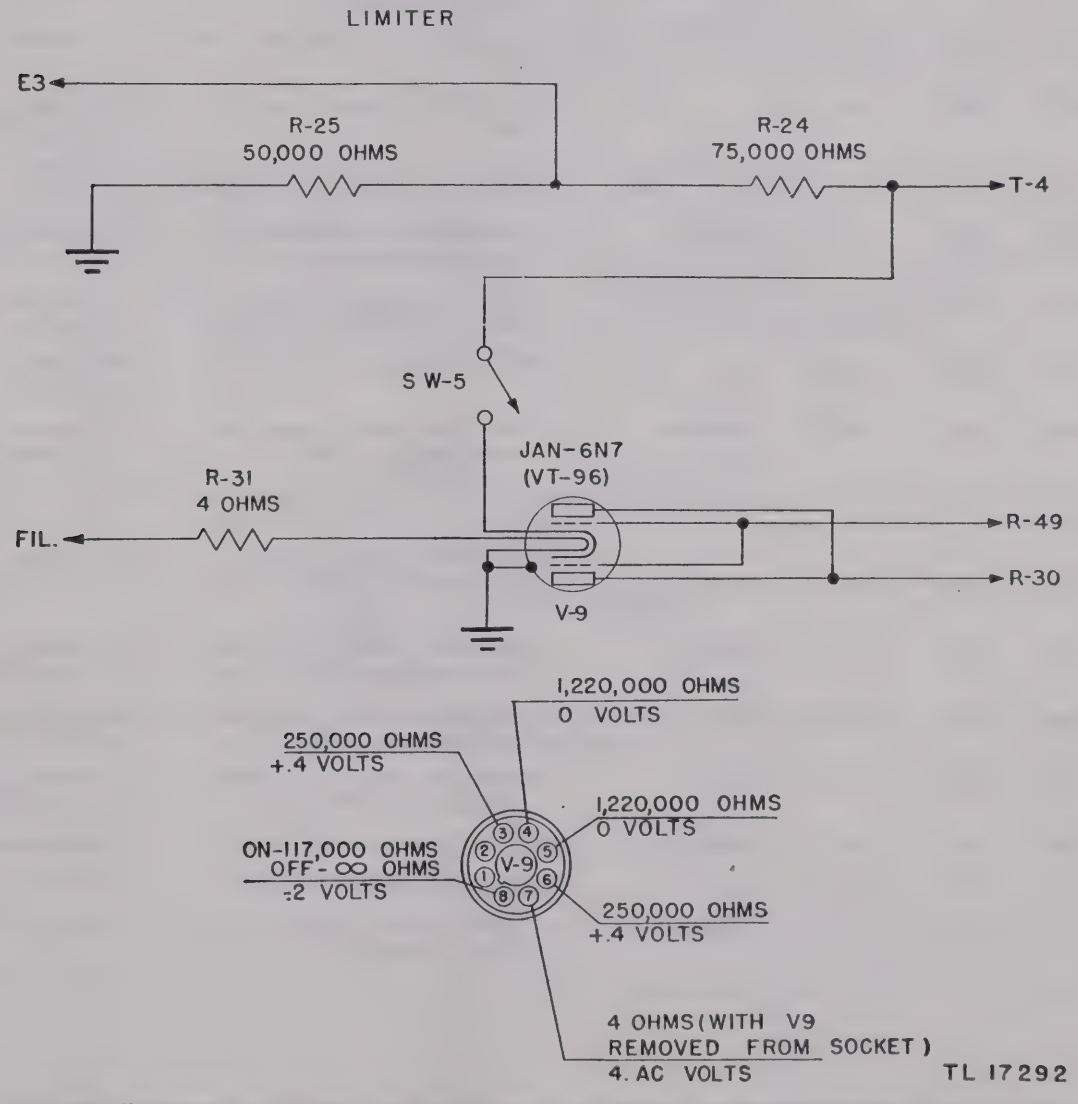


Figure 41. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of noise limiter stage.

52. Beat-Frequency Oscillator Stage V10

a. Circuit Features. The beat-oscillator tube (V10) and associated oscillator circuit (T5) provide an i-f voltage of approximately 465 kc. When introduced into the second detector circuit by means of capacitor C41, this voltage mixes with the i-f signal being delivered to the detector from the third i-f stage. The mixture or heterodyning of these two similar frequencies results in a "beat" or difference frequency in the output of the second detector. The beat-frequency oscillator (bfo) is switched into the circuit by throwing the SIGNAL-MOD-CW switch (SW3) to CW position.

b. Circuit Differences. The beat-frequency oscillator stage V10 is identical in all the subject receivers.

c. Parts List for Beat-Frequency Oscillator Stage V10.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
184	T5	T5	T5	2C4528.7/9	TRANSFORMER: 465 kc oscillator assembly.	B-frequency oscillator.
185	C46	C46	C46	----	CAPACITOR, variable: air; 100 mmf.	B-frequency oscillator.
186	C47	C47	C47	----	CAPACITOR, variable: air; 9 mmf.	B-frequency oscillator pitch control.
187	C48	C48	C48	3K2091032	CAPACITOR, fixed: silver mica; 95 mmf + 2%; 500 vdcw.	B-frequency parallel padder.
188	C49	C49	C49	3D9620	CAPACITOR, fixed: mica; 600 mmf ± 10%; 300 vdcw.	B-frequency oscillator feedback.
189	C50	C50	C50	3D9100–64	CAPACITOR, fixed: mica; 100 mmf ± 5%; 500 vdcw.	B-frequency grid coupling.
190	L33	L33	L33	----	COIL, transformer.	B-frequency oscillator tuning.
191	R50	R50	R50	3Z6700–6	RESISTOR, fixed; metalized; 100,000 ohms ± 10%; 1/2 w.	B-frequency oscillator grid leak.
192	C17	C17	C17	3DA250–39	CAPACITOR, fixed: paper; 0.25 mf + 20% —10%; 600 vdcw.	Extra a-v-c timing for cw.
193	C27	C27	C27	3DA50–55	CAPACITOR, fixed: paper; 50,000 mmf + 20%; —10%; 600 vdcw.	B-frequency oscillator plate bypass.
194	R33	R33	R33	3Z6750–4	RESISTOR, fixed: metalized; 500,000 ohms + 10%; 1/2 w.	B-frequency oscillator screen dropping.
195	R34	R34	R34	3Z6650–10	RESISTOR, fixed: metalized; 50,000 ohms ± 10%; 1/2 w.	B-frequency oscillator plate dropping.
196	R35	R35	R35	3Z4528	RESISTOR, fixed: metalized; 5,000 ohms ± 10%; 1/2 w.	Oscillator plate and screen filter.
197	SW3	SW3	SW3	3Z9900–1	SWITCH, rotary snap: DPST.	Modulation–CW switch.
198	V10	V10	V10	2T116	TUBE, electron: JAN–6SJ7.	B-frequency oscillator.
199	X10	X10	X10	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V10.

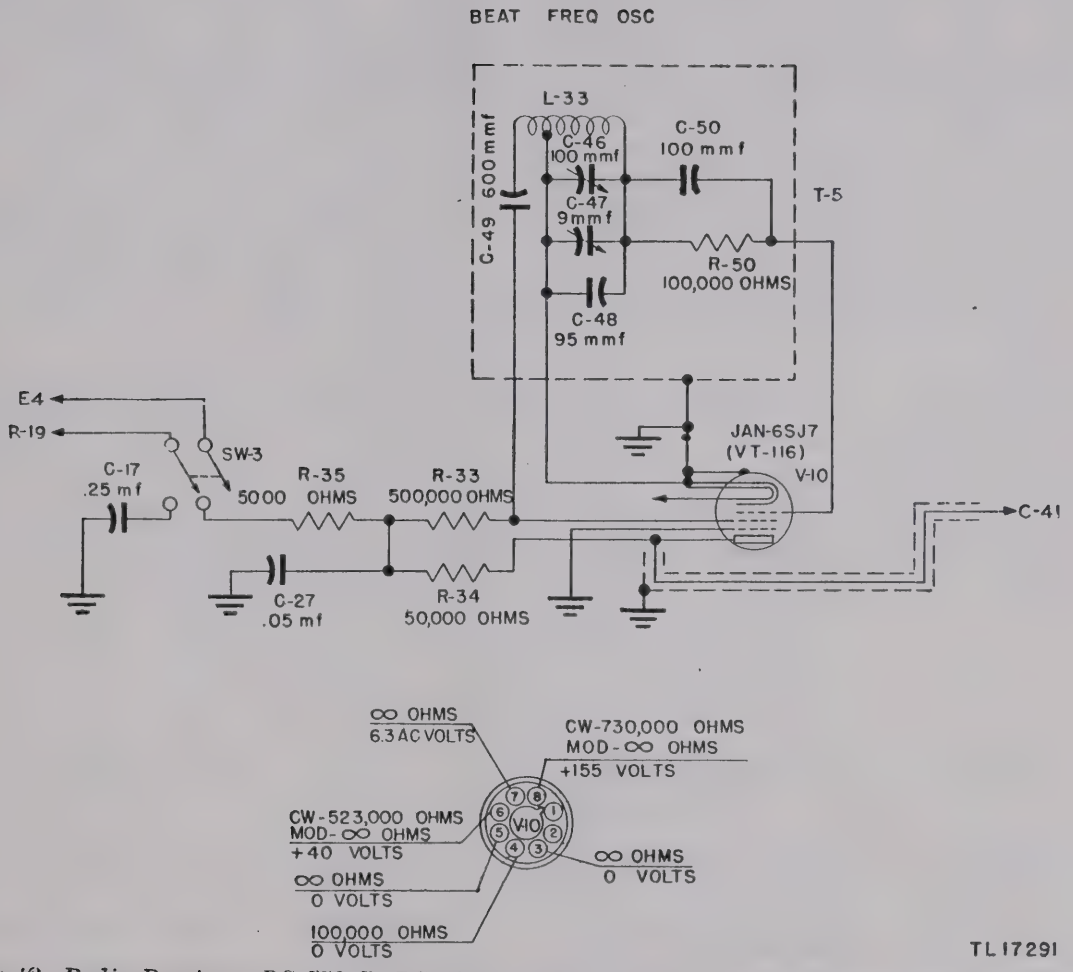


Figure 42. Radio Receivers BC-779-B, BC-794-B, and BC-1004-C, schematic diagram of beat-frequency oscillator stage V10.

53. A-V-C Circuit, V11 and V12, Including Bias Supply and Sensitivity Meter Circuit

a. Circuit Features. (1) *A-V-C Amplifier and rectifier.* The a-v-c amplifier tube V11 is a pentode. The a-v-c rectifier V12 is a class B, twin triode. The control grid of V11 is connected in parallel with the control grid of the third i-f amplifier V7, which is driven from the tap on secondary coil L31 of transformer T3. Transformer T6 in the a-v-c circuit has a tuned primary and closely coupled, untuned secondary (L34). The untuned secondary is connected to both diode plates of V12, and to the diode load composed of R53, R54, and R55. Control voltage is obtained from the high end of resistor R53 and connected to the AVC-MANUAL switch (SW4), through an i-f filter consisting of resistor R52 and bypass capacitor C56. Amplifier i-f voltages present in the plate circuit of V11 are impressed on the a-v-c rectifier tube V12 by means of T6.

(2) *A-V-C System with S meter.* The S meter is included in the a-v-c circuit when switch SW4 is set for AVC. It is connected in shunt with the 1,000-ohm potentiometer R41, which is in series with the a-v-c diode load so that some of the rectified d-c current flows through the meter. The setting of R41 controls the degree of meter deflection and is usually adjusted to produce a reading of S–9 on a 50-microvolt signal at 3.5 mc. When so adjusted, a change of one S number on the meter indicates a change in signal strength of approximately two to one.

(3) *Automatic volume control for C-W reception.* For c-w reception, a longer time constant is obtained by adding a 0.25-mf capacitor (C17) in parallel with the 0.05-mf capacitor (C56). This extra timing capacitor (C17) is automatically added to the a-v-c system when the SIGNAL-MOD-CW switch (SW3) is tuned to CW. The low potential end of the a-v-c rectifier diode load and the parallel cathodes of the diode itself are returned to the —3 volt point on the C bias voltage divider. This provides the minimum recommended grid bias for the controlled r-f and i-f amplifier tubes (V1, V2, V5, and V6), without regard to any negative bias furnished by the diode V12.

b. Circuit Differences. The a-v-c, bias supply, and S meter circuits are identical in Radio Receivers BC–779–B, BC–794–B, and BC–1004–C. Radio Receiver BC–1004–D does not contain the sensitivity meter M1. In all other respects it is the same as the BC–1004–C.

c. Parts List for A-v-c Circuit, V11 and V12, Including Bias Supply and Sensitivity Meter Circuit.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
200	T6	T6	T6	2C4528.6/8	TRANSFORMER ASSEMBLY: fixed selectivity.	AVC diode input.
201	C51	C51	C51		CAPACITOR, variable: air; 100 mmf.	AVC amplifier plate tuning.
202	C52	C52	C52	----	CAPACITOR, fixed: paper; 5,000 mf + 20% —10%; 500 vdcw.	AVC r-f bypass.
203	C53	C53	C53	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20% —10%; 600 vdcw.	AVC amplifier plate bypass.
204	C54	C54	C54	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20% —10%; 600 vdcw.	AVC r-f filter.
205	C55	C55	C55	3DA10–124	CAPACITOR, fixed: paper; 10,000 mmf + 20% —10%; 600 vdcw.	AVC r-f filter.
206	C56	C56	C56	3DA50–55	CAPACITOR, fixed: paper; 50,000 mmf + 20% —10%; 600 vdcw.	AVC timing.
207	L34	L34	L34		COIL, transformer:	AVC diode input.
208	R51	R51	R51	3Z4526	RESISTOR, fixed: metalized; 2,000 ohm ± 10%; 1/2 w.	AVC amplifier plate filter.
209	R52	R52	R52	3Z6801–1	RESISTOR, fixed: metalized; 1 megohm + 10%; 1/2 w.	AVC timing.
210	R53	R53	R53	3Z6625–4	RESISTOR, fixed: metalized; 25,000 ohms + 10%; 1/2 w.	AVC diode load.
211	R54	R54	R54	3Z4528	RESISTOR, fixed: metalized; 5,000 ohms + 10%; 1/2 w.	AVC diode load.
212	R55	R55	R55	3Z4528	RESISTOR, fixed: metalized: 5,000 ohms + 10%; 1/2 w.	AVC diode load.
213	C18B	C18B	C18B	3DA50–51	CAPACITOR, fixed: paper in metal case; 3 × 0.05 mf + 20% —10%; 600 vdcw.	Common grid return bypass.
214	C29	C29	C29	3DA50–55	CAPACITOR, fixed: paper; 0.05 mf + 20% —10%; 600 vdcw.	AVC amplifier screen bypass.
215	C30	C30	C30	3DA50–39	CAPACITOR, fixed: paper; 25 mf + 20% —10%; 600 vdcw.	3-volt C bias bypass.
216	M1	M1	M1	2C4528.7/15	METER, 0–200 micro-amps.	Tuning and S indicator.
217	R19	R19	R19	3Z4542	RESISTOR, fixed: metalized; 2 megohms ± 10%; 1/2 w.	AVC-MANUAL shunt.
218	R37	R37	R37	3Z6650–15	RESISTOR, fixed: metalized; 50,000 ohms ± 10%; 1 w.	AVC amplifier screen filter.
219	R38	R38	R38	3Z6030–8	RESISTOR, fixed: metalized; 300 ohms ± 5%; 1/2 w.	C bias voltage divider.
220	R39	R39	R39	3Z6170	RESISTOR, fixed: metalized; 1,700 ohms ± 5%; 1/2 w.	C bias voltage divider.
221	R40	R40	R40	3Z6300–1	RESISTOR, fixed: metalized; 3,000 ohms ± 5%; 1 w.	C bias voltage divider.
222	R40	R40	R40	3Z6300–1	RESISTOR, fixed: metalized; 3,000 ohms + 5%; 3,000 ohms ± 5%; 1 w.	C bias voltage divider.

c. PARTS LIST FOR A-V-C CIRCUIT, V11 AND V12, INCLUDING BIAS SUPPLY AND SENSITIVITY METER CIRCUIT.—*Continued*

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
223	R41	R41	R41	2Z7268.13	RESISTOR, variable: carbon: 1,000 ohms ± 20%.	S meter shunt.
224	R56	R56	R56	2Z7270.16	RESISTOR, variable: carbon: 50,000 ohms ± 20%.	Sensitivity r-f and i-f.
225	SW4	SW4	SW4	3Z9900–6	SWITCH, toggle: DPDT.	AVC—MANUAL.
226	V11	V11	V11	2T117	TUBE, electron: JAN–6SK7.	AVC—amplifier.
227	V12	V12	V12	2T90	TUBE, electron: JAN–6H6.	AVC—rectifier.
228	X11	X11	X11	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V11.
229	X12	X12	X12	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V12.

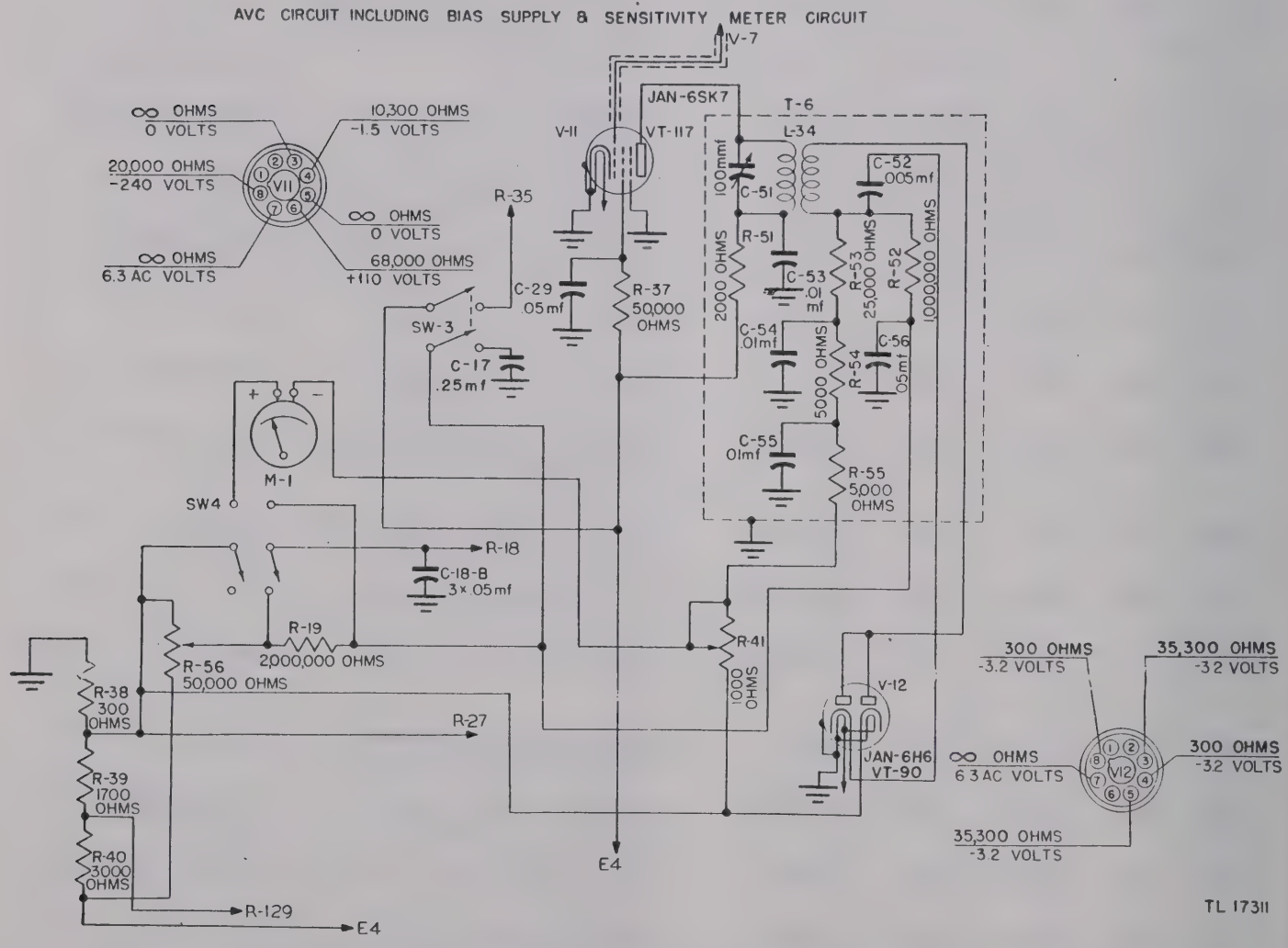


Figure 43. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of a-v-c, bias supply, and sensitivity meter circuit.

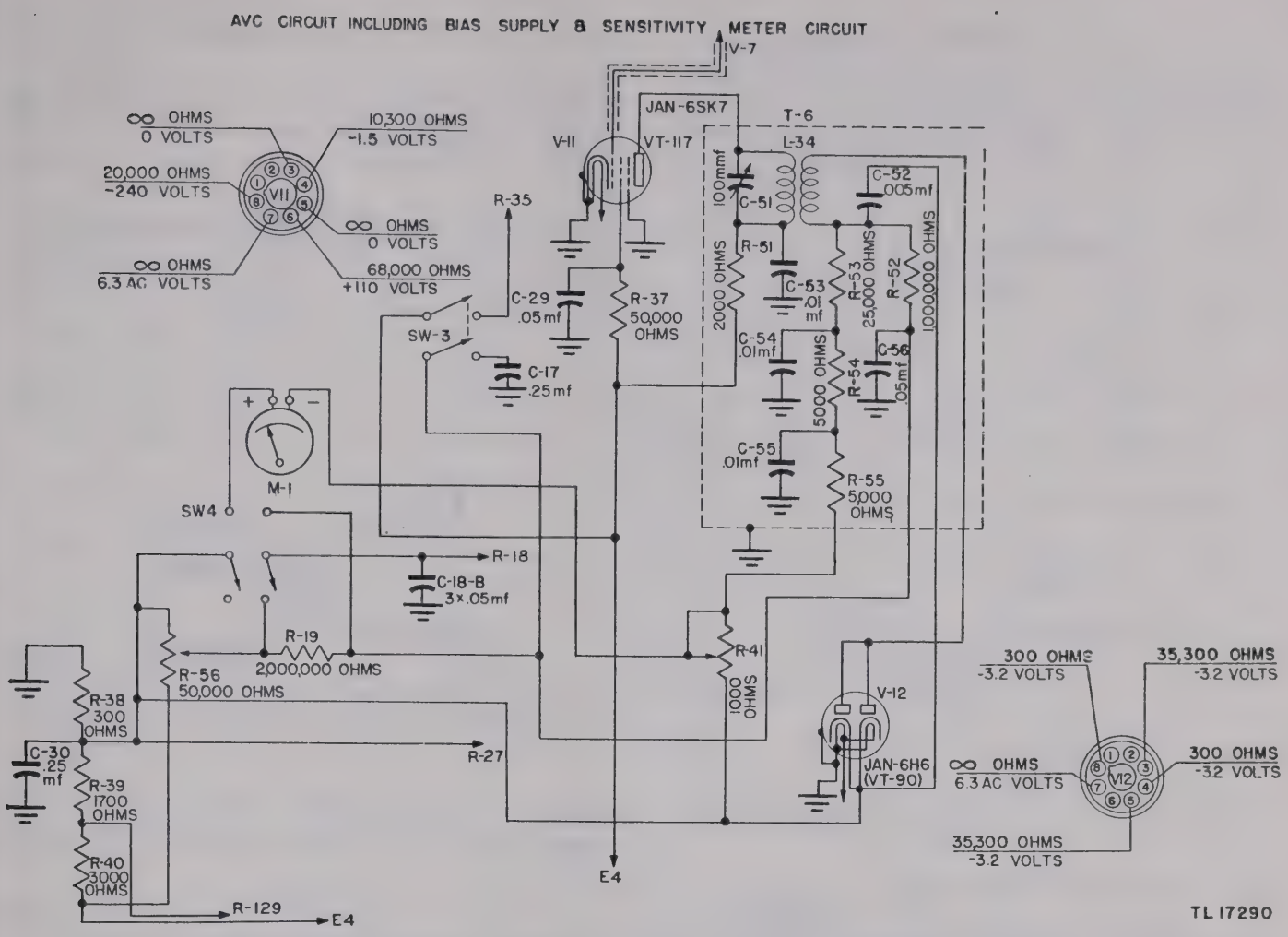


Figure 44. Radio Receiver BC–779–B, schematic diagram of a-v-c, bias supply, and sensitivity meter circuit.

54. First A-F Stage V13

a. Circuit Features. The first audio-frequency (a-f) stage tube V13 is a triode. The grid of the tube is connected to the moving arm of the AUDIO-GAIN Control (R26) through a blocking capacitor (C24). The plate is coupled to the grid of the next stage (a-f driver) by means of capacitor C25, plate resistor R28, and grid leak resistor R29.

b. Circuit Differences. The first a-f stage V13 is identical in all the subject receivers.

c. Parts List for A-f Stage V13.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
230	C24	C24	C24	3DA20–50	CAPACITOR, fixed: paper; 0.02 mf + 20% —10%; 600 vdcw.	1st a-f grid coupling.
231	R26	R26	R26	2C4528.6/16	RESISTOR, variable: carbon: 250,000 ohms ± 20%.	A-f gain control.
232	R27	R27	R27	3Z6750–4	RESISTOR, fixed: metalized: 500,000 ohms + 10%; 1/2 w.	1st a-f grid coupling.
233	R28	R28	R28	3Z6650–15	RESISTOR, fixed: metalized; 50,000 ohms ± 10%; 1 w.	1st a-f plate coupling.
234	V13	V13	V13	2T65	TUBE, electron: JAN–6C5.	1st a-f amplifier.
235	X13	X13	X13	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V13.

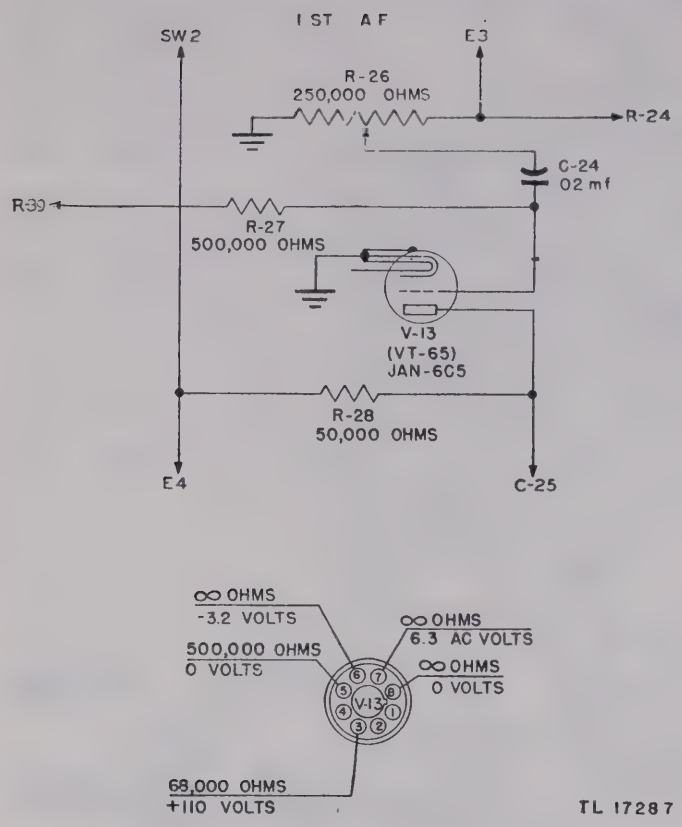


Figure 45. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of first a-f stage.

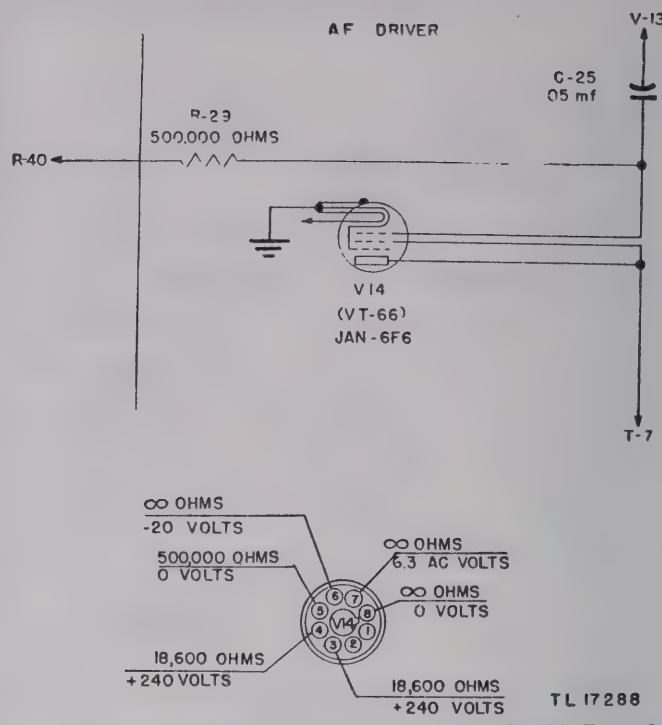


Figure 46. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of a-f driver stage.

55. A-F Driver Stage V14

a. Circuit Features. The a-f driver stage V14 uses a pentode as a triode, by connecting the plate and screen together. This tube drives the output stage via the push-pull input transformer T7.

b. Circuit Differences. The a-f driver stage V14 is identical in all the subject receivers.

c. Parts List for A-F Driver Stage V14.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
236	C25	C25	C25	3DA50–55	CAPACITOR, fixed: paper; 0.05 mf + 20% —10%: 600 vdcw.	2d a-f grid coupling.
237	R29	R29	R29	3Z6750–4	RESISTOR, fixed: metalized; 500,000 ohms ± 10%: 1/2 w.	2d a-f grid coupling.
238	V14	V14	V14	2T66	TUBE, electron: JAN–6F6.	2d a-f driver amplifier.
239	X14	X14	X14	2Z8795–12	SOCKET, tube: standard octal; molded bakelite.	Socket for V14.

56. A-F Output Stages V15 and V16

a. Circuit Features. The output circuit is a push-pull arrangement using two pentodes (V15 and V16) connected as triodes. They are operated as class AB_2 amplifiers. This means that grid current flows during some part of the input cycle. For a power output up to approximately 3 watts, no grid current flows, and harmonic distortion is negligible. Above 3 watts, and up to 10 watts (maximum output), grid current increases steadily, causing a corresponding increase in distortion. The input transformer (T7) and the output transformer (T8) are similar in characteristics and construction. The output transformer (T8) has two secondary windings: a 600-ohm secondary (4–5) for power output, and a secondary for headphones (6–7) designed to deliver about 3 percent of the output power into an 8,000-ohm resistive load when the 600-ohm secondary is connected to a matching load. The turns, ratio, and resistance of the headphone winding are such that the power delivered to any load between 8,000 ohms and 80 ohms varies less than 6 decibels, and the power input to a 250-ohm load

is only 2 decibels greater than that to a 4,000-ohm load.

b. Circuit Differences. The a-f output stages V15 and V16 are identical in all the subject receivers.

57. Miscellaneous Parts

a. General. The parts listed in this paragraph are not included in individual stage parts lists but are necessary for the proper operation and maintenance of the receivers.

c. Parts List for A-f Output Stages V15 and V16.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
240	C28	C28	C28	3DB40	CAPACITOR, fixed: dry electrolytic; 40 mf; 150 vdcw.	A-f output cathode bypass.
241	J1	J1	J1	2Z5534A	JACK, telephone.	For headphone plug.
242	R36	R36	R36	3Z6075–1	RESISTOR, fixed: wire-wound; 750 ohms + 5%; 10 w.	3d a-f cathode bias.
243	T7	T7	T7	2Z9635–7	TRANSFORMER, a-f: push-pull input.	Input transformer.
244	T8	T8	T8	2Z9632.66	TRANSFORMER, a-f: push-pull.	Output.
245	V15	V15	V15	2T66	TUBE, electron: JAN–6F6	3d a-f amplifier.
246	V16	V16	V16	2T66	TUBE, electron: JAN–6F6	3d a-f amplifier.
247	X15	X15	X15	2Z8795.12	SOCKET, tube: standard octal; molded bakelite.	Socket for V15.
248	X16	X16	X16	2Z8795.12	SOCKET, tube: standard octal.	Socket for V16.

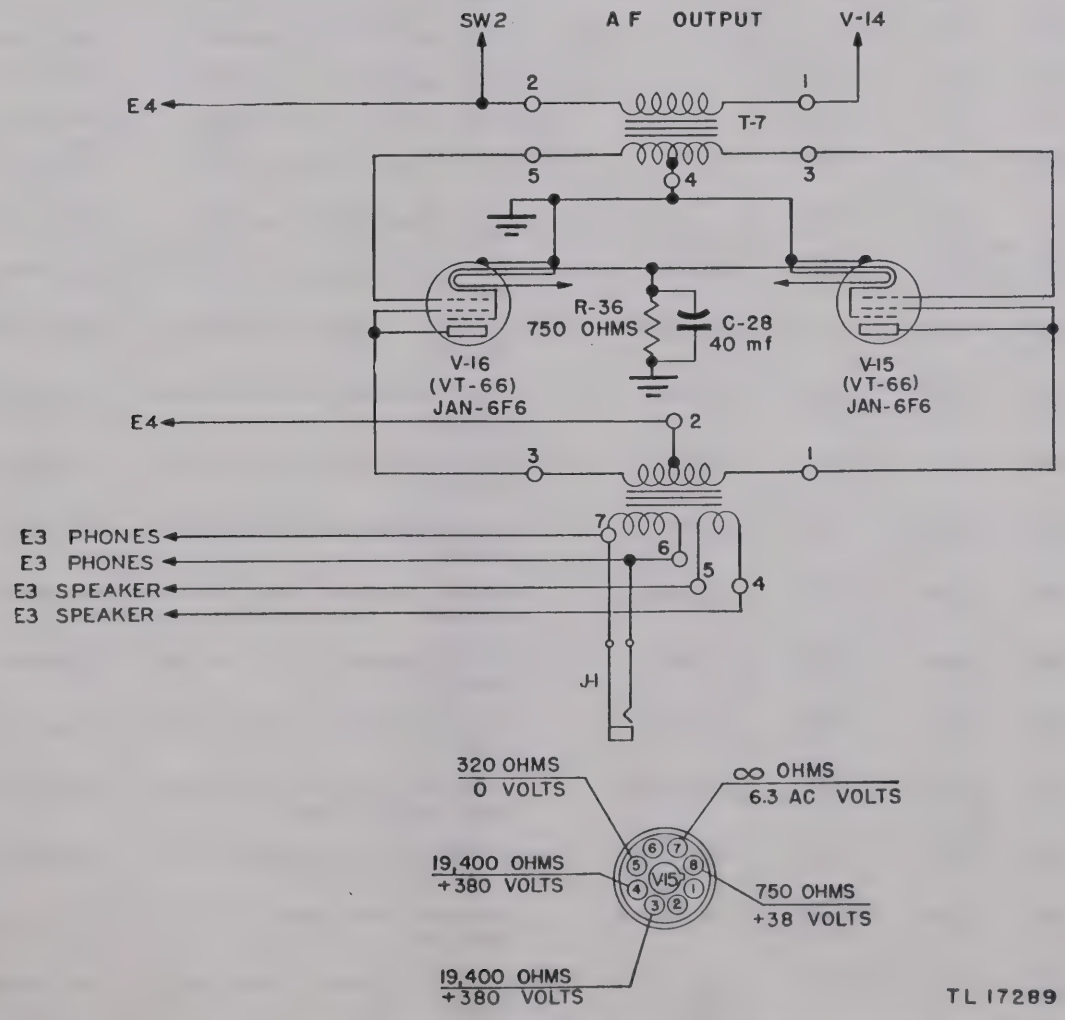


Figure 47. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, schematic diagram of a-f output stage.

b. Parts List for Miscellaneous Parts.

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
249	C31A	C31A	C31A	3DA250–20	CAPACITOR, fixed: paper in metal case; 2 × 25 mf + 20% — 10%.	B+ 250 volt bypass.
250	C31B	C31B	C31B	3DA250–20	CAPACITOR, fixed: paper in metal case; 2 × 25 mf + 20% — 10%.	B+ 100 volt bypass.
251	E2	E2	E2	2C4528.7/38	BOARD, terminal: 2 screw terminals; bakelite.	Send-receive relay.
252	E3	E3	E3	2C4528.7/39	BOARD, terminal: 6 screw terminals; bakelite.	Phone-speaker. Phones connections.
253	E4	E4	E4	2C4528/35	BOARD, terminal: 10 screw terminals; bakelite.	Power supply connections.
254	E5	E5	E5	----	COVER, terminal: steel.	Cover for E2.
255	E6	E6	E6	----	COVER, terminal: steel.	Cover for E4.
256	E7	E7	E7	----	KNOB, round: black bakelite.	Crystal filter selectivity control.
257	E8	E8	E8	----	KNOB, round: black bakelite.	Crystal filter phasing control.
258	E9	E9	E9	----	KNOB, round: black bakelite.	Band width control.
259	E10	E10	E10	----	KNOB, round: black bakelite.	Limiter switch control.
260	E11	E11	E11	----	KNOB, round: black bakelite.	Main tuning control.
261	E12	E12	E12	----	KNOB, round: black bakelite.	Sensitivity control.
262	E13	E13	E13	----	KNOB, round: black bakelite.	Band spread tuning.
263	E14	E14	E14	----	KNOB, round: black bakelite.	MOD-CW switch control.
264	E15	E15	E15	----	KNOB, round: black bakelite.	AF gain control.
265	E16	E16	E16	----	KNOB, round: black bakelite.	SEND-REC switch control.
266	E17	E17	E17	----	KNOB, round: black bakelite.	Bfo pitch control.
267	E18	E18	E18	2Z9466.1	BOARD, terminal: 6 lug contacts; bakelite.	Component mounting.
268	E19	E19	E19	2Z9466.1	BOARD, terminal: 6 lug contacts; bakelite.	Component mounting.
269	E20	E20	E20	2Z9466.1	BOARD, terminal: 6 lug contacts; bakelite.	Component mounting.
270	E21	E21	E21	2Z9466.1	BOARD, terminal: 6 lug contacts; bakelite.	Component mounting.
271	E22	E22	E22	2Z9464.2	BOARD, terminal: 4 lug contacts; bakelite.	Component mounting.
272	E23	E23	E23	2Z9409.4	BOARD, terminal: 9 lug contacts; bakelite.	Component mounting.
273	E24	E24	E24	2Z9409.4	BOARD, terminal: 9 lug contacts; bakelite.	Component mounting.
274	E25	E25	E25	2Z9409.4	BOARD, terminal: 9 lug contacts; bakelite.	Component mounting.
275	E26	E26	E26	2Z5988–13	LAMPHOLDER, miniature screw base: metal bracket.	Dial light.
276	E27	E27	E27	2Z5988–13	LAMPHOLDER, miniature screw base: metal bracket.	Dial light.
277	E28	E28	E28	2Z5988–13	LAMPHOLDER, miniature screw base: metal bracket.	S meter light.
278	H1	H1	H1	----	NUT, cap: knurled: nickel-plated: brass: 8–32.	Dust cover fastening.

b. Parts List for Miscellaneous Parts.—*Continued*

Function No.	BC–779	BC–794	BC–1004	Signal Corps stock No.	Name of part and description	Function
279	H2	H2	H2	----	NUT, cap: knurled; nickel-plated; brass; 6–32.	Dust cover fastening.
280	H3	H3	H3	----	SCREW, cap: knurled; nickel-plated.	S meter mounting.
281	I1	I1	I1	2Z5925	LAMP, incandescent: 6–8 v; 0.15 amp; miniature screw base.	Dial light.
282	I2	I2	I2	2Z5925	LAMP, incandescent: 6–8 v; 0.15 amp; miniature screw base.	Dial light.
283	I3	I3	I3	2Z5925.1	LAMP, incandescent: 6–8 v; 0.15 amp; miniature bayonet type base.	Meter light.
284	N1	--	--	----	KNOB, round: dial marked 100–200 kc, 200–400 kc, 2.5–5.0 mc, 5–10 mc, 10–20 mc.	Band change switch.
284	--	N5	--	----	KNOB, round: dial marked 1,200–2,500 kc, 2.5–5.0 mc, 5–10 mc, 10–20 mc, 20–40 mc.	Band change switch.
284	--	--	N7	----	KNOB, round: dial marked 540–1,160 kc, 1,160–2,500 kc, 2.5–5.0 mc, 5–10 mc, 10–20 mc.	Band change switch.
285	N2	--	--	2C4528.3/14	DIAL, assembly: calibrated, with marking disk.	Main tuning.
285	--	N6	--	2C4528.5/14	DIAL, assembly: calibrated, with marking disk, 5 scales.	Main tuning.
285	--	--	N8	2C4528/14	DIAL assembly: calibrated, with marking disk, 5 scales.	Main tuning.
286	N3	N3	N3	2C4528.3/13	DIAL assembly: calibrated, with disk.	Band spread tuning.
287	N4	N4	N4	----	DRIVE, dial: bearing shaft and driving disks.	Main and band spread dial drive.
288	R32	R32	R32	2C4528.6/19	RESISTOR, fixed: wire-wound; 4 ohms + 10%; 5 w.	Dial lamp series dropping.
289	SW2	SW2	SW2	3Z9900–2	SWITCH, rotary snap: SPST.	Send-receive switch.
290	SW6	SW6	SW6	3Z9900	SWITCH, toggle: DPST.	Power off-on.

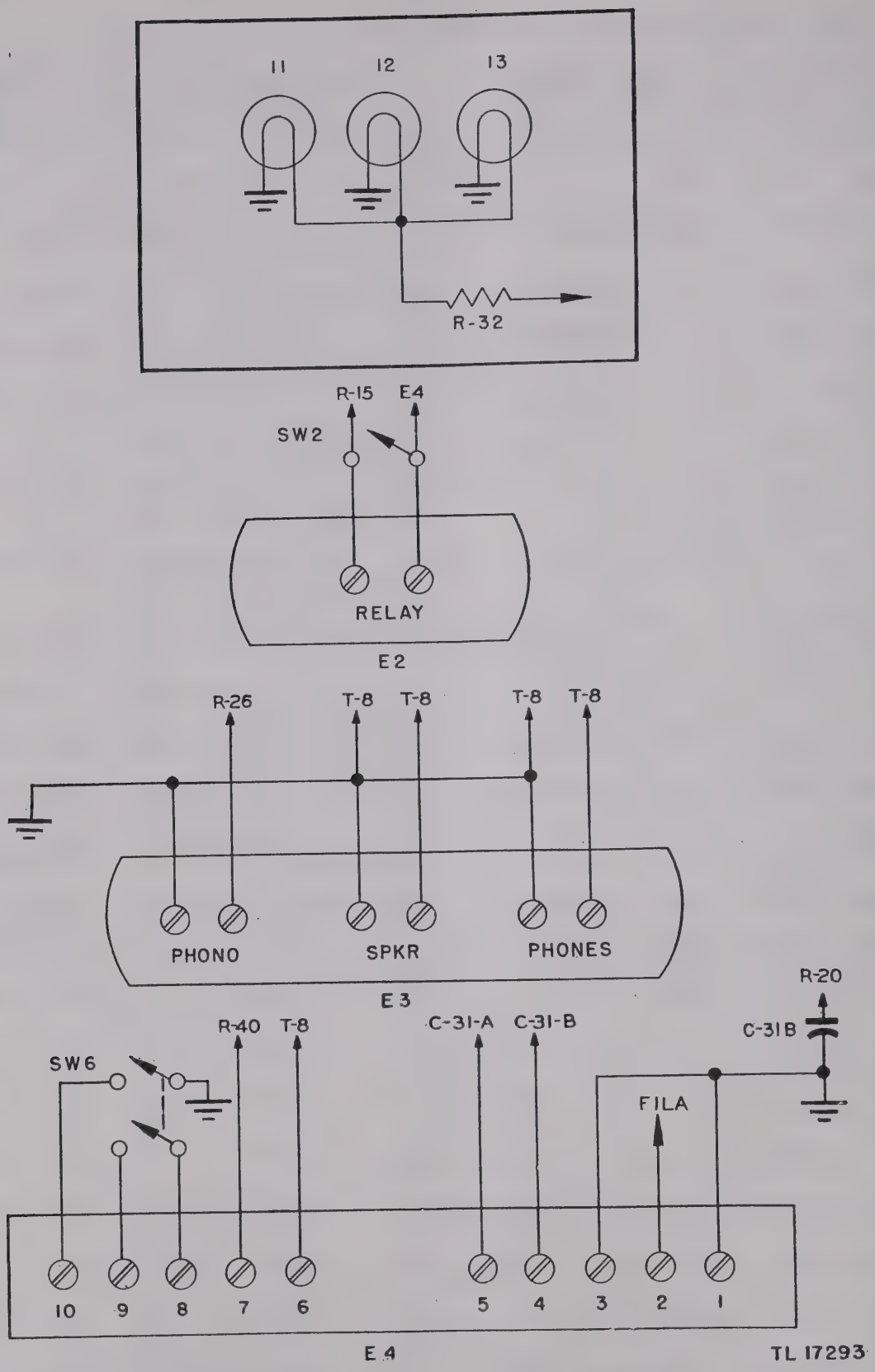


Figure 48. Radio Receivers BC–779–B, BC–794–B, and BC–1004–C, diagrams of miscellaneous parts.

SECTION IX
SUPPLEMENTARY DATA

58. Parts Identification

The following illustrations are provided to aid in identifying and servicing the various component parts of the subject receivers.

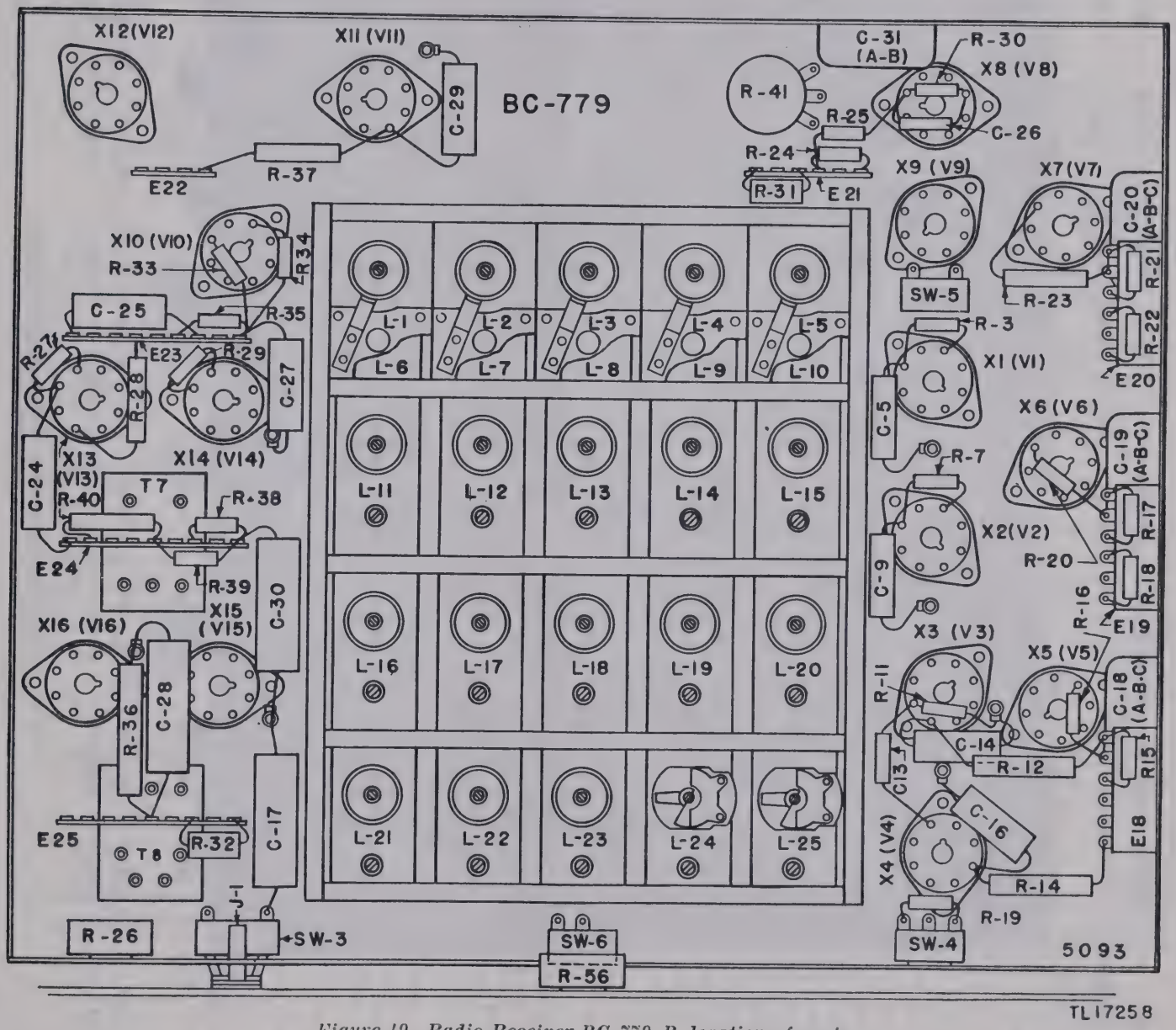


Figure 49. Radio Receiver BC–779–B, location of parts.

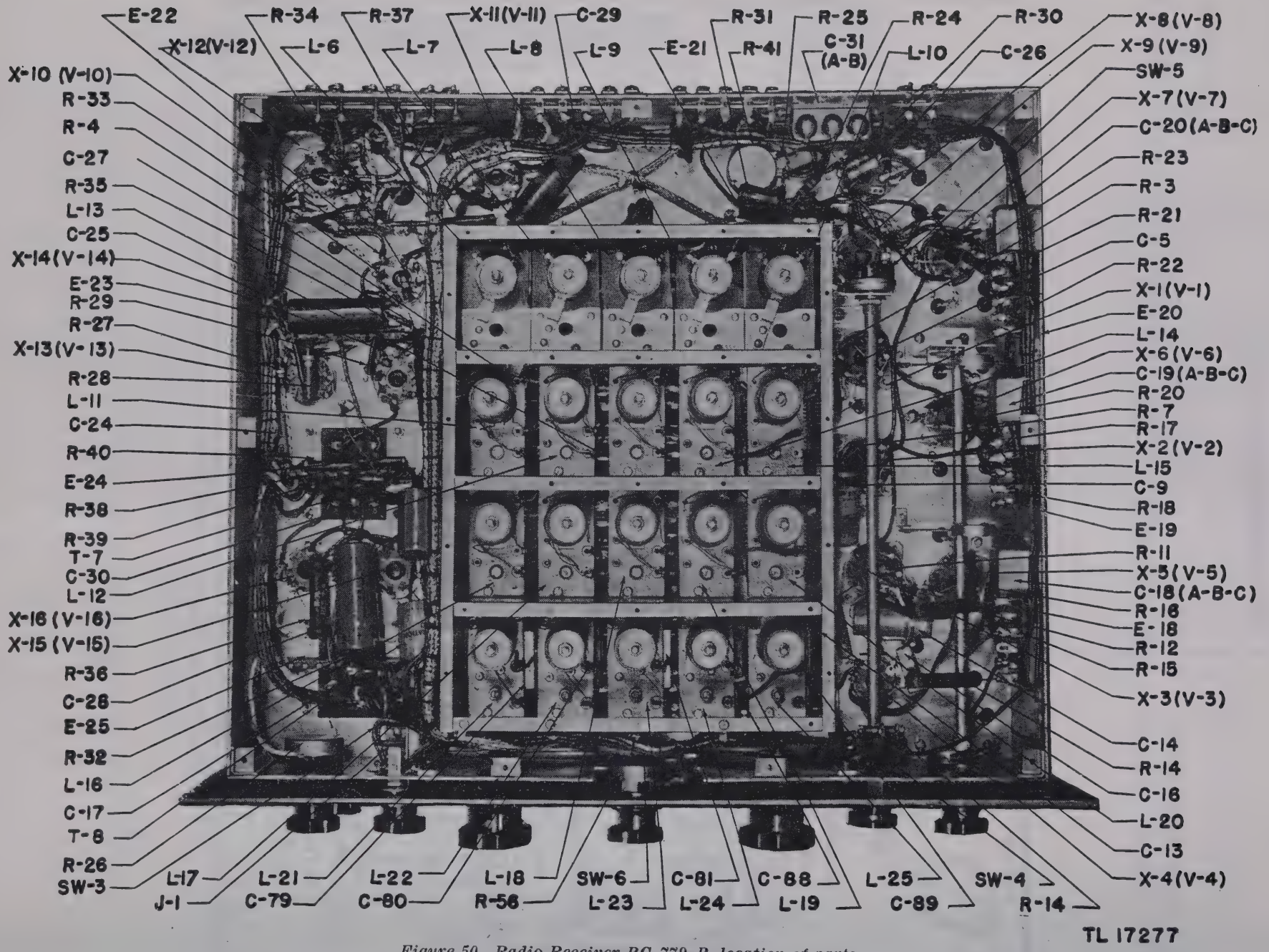


Figure 50. Radio Receiver BC–779–B, location of parts.

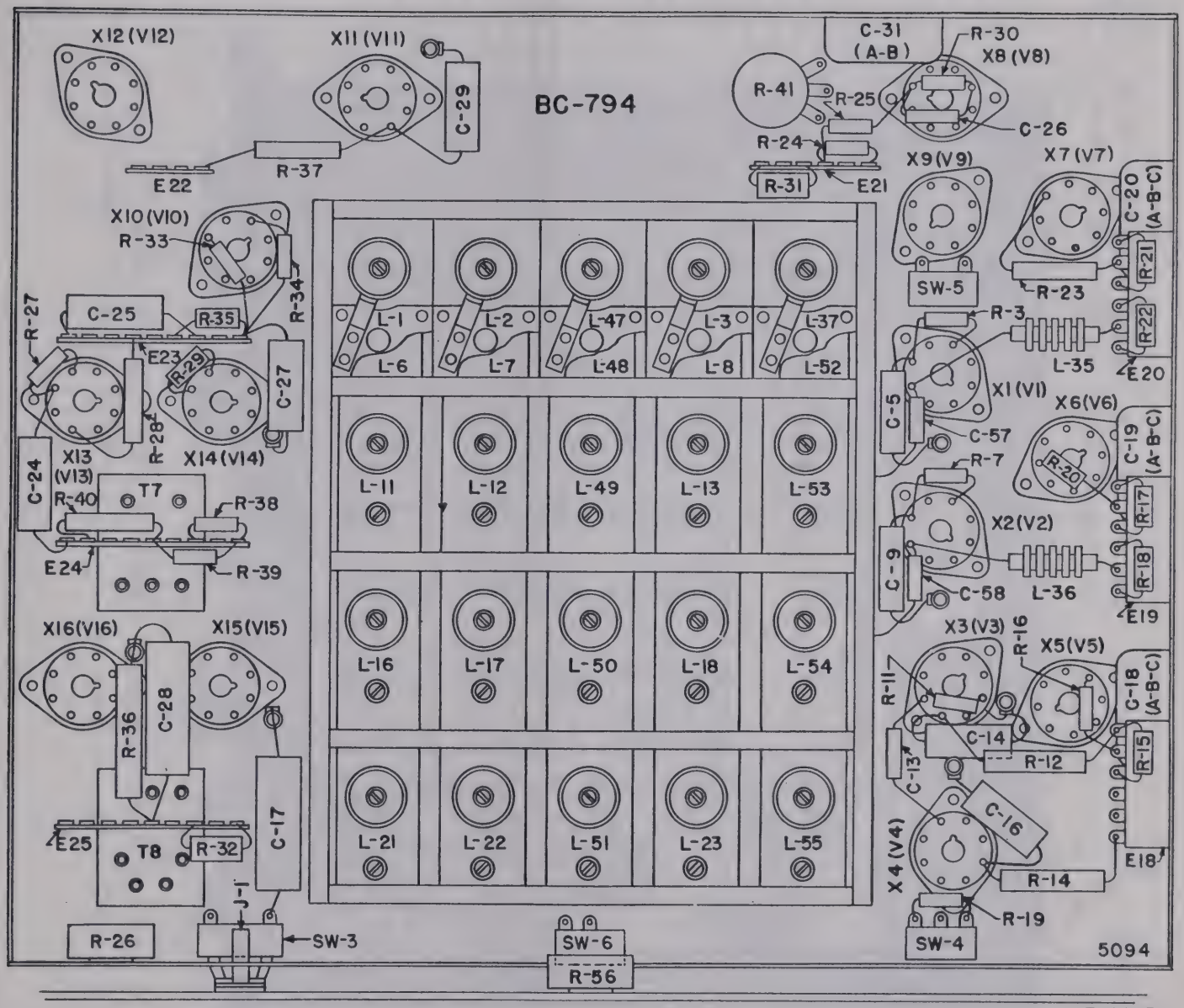


Figure 51. Radio Receiver BC-794-B, location of parts.

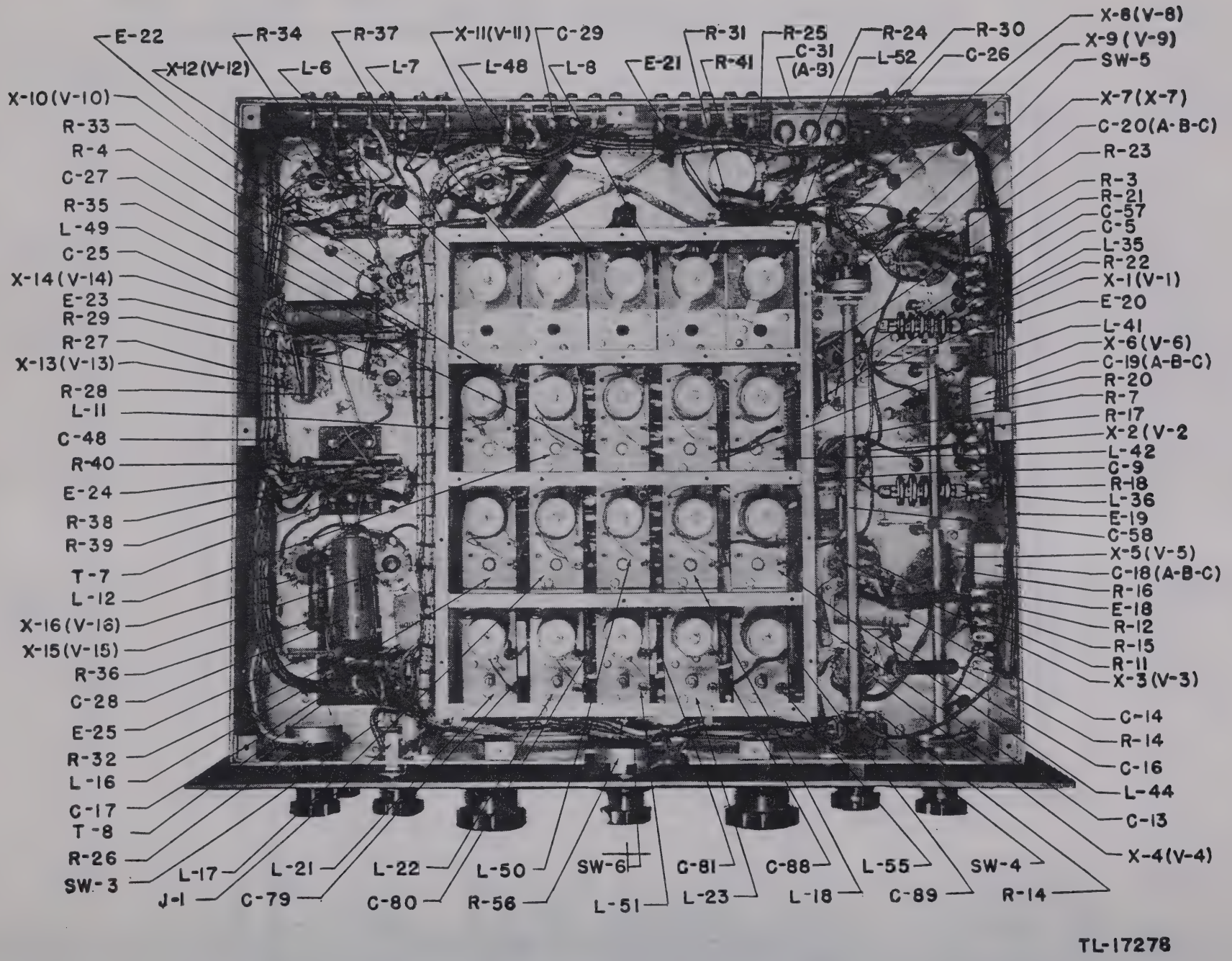


Figure 52. Radio Receiver BC–794–B, location of parts.

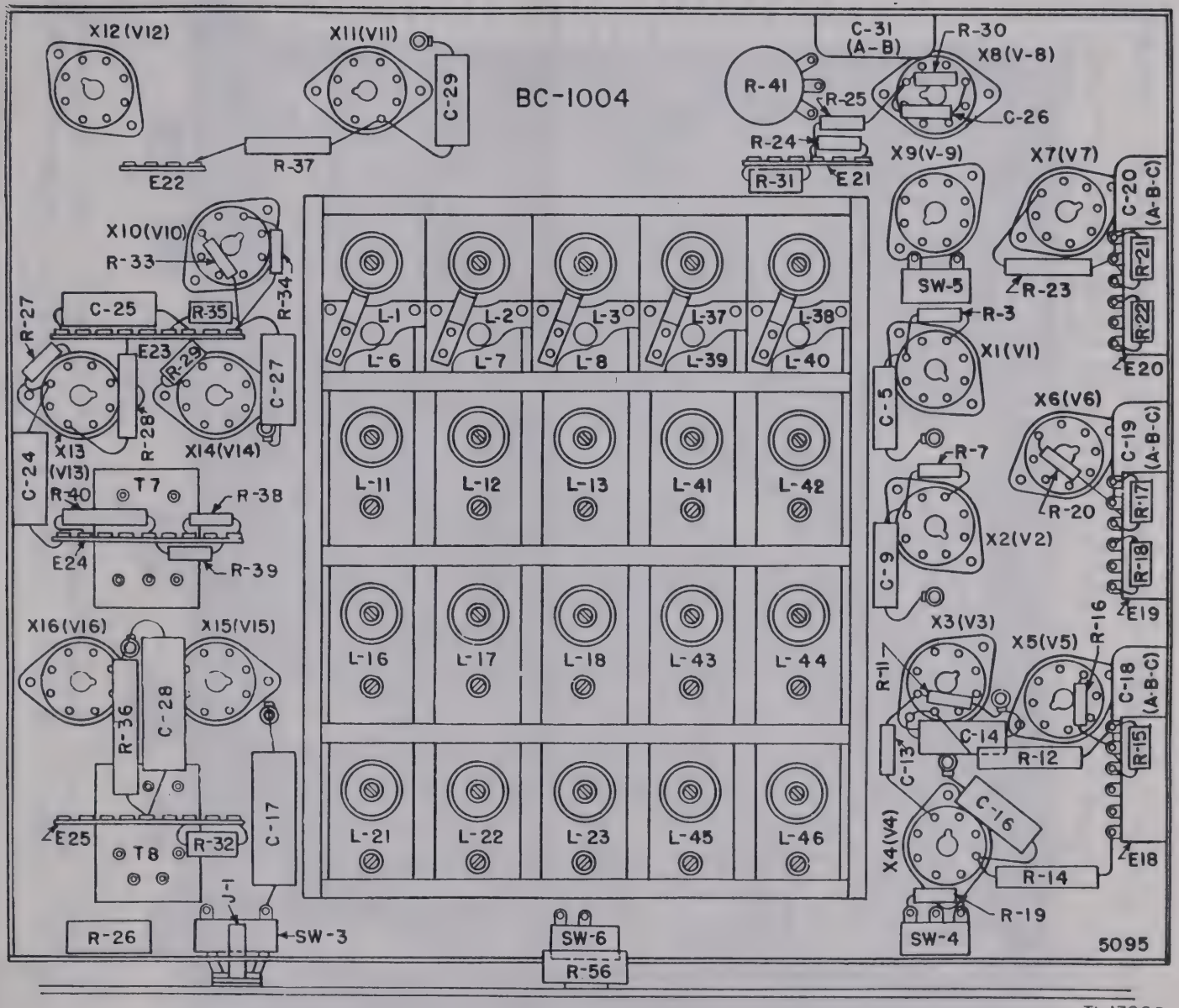


Figure 53. Radio Receiver BC–1004–C, location of parts.

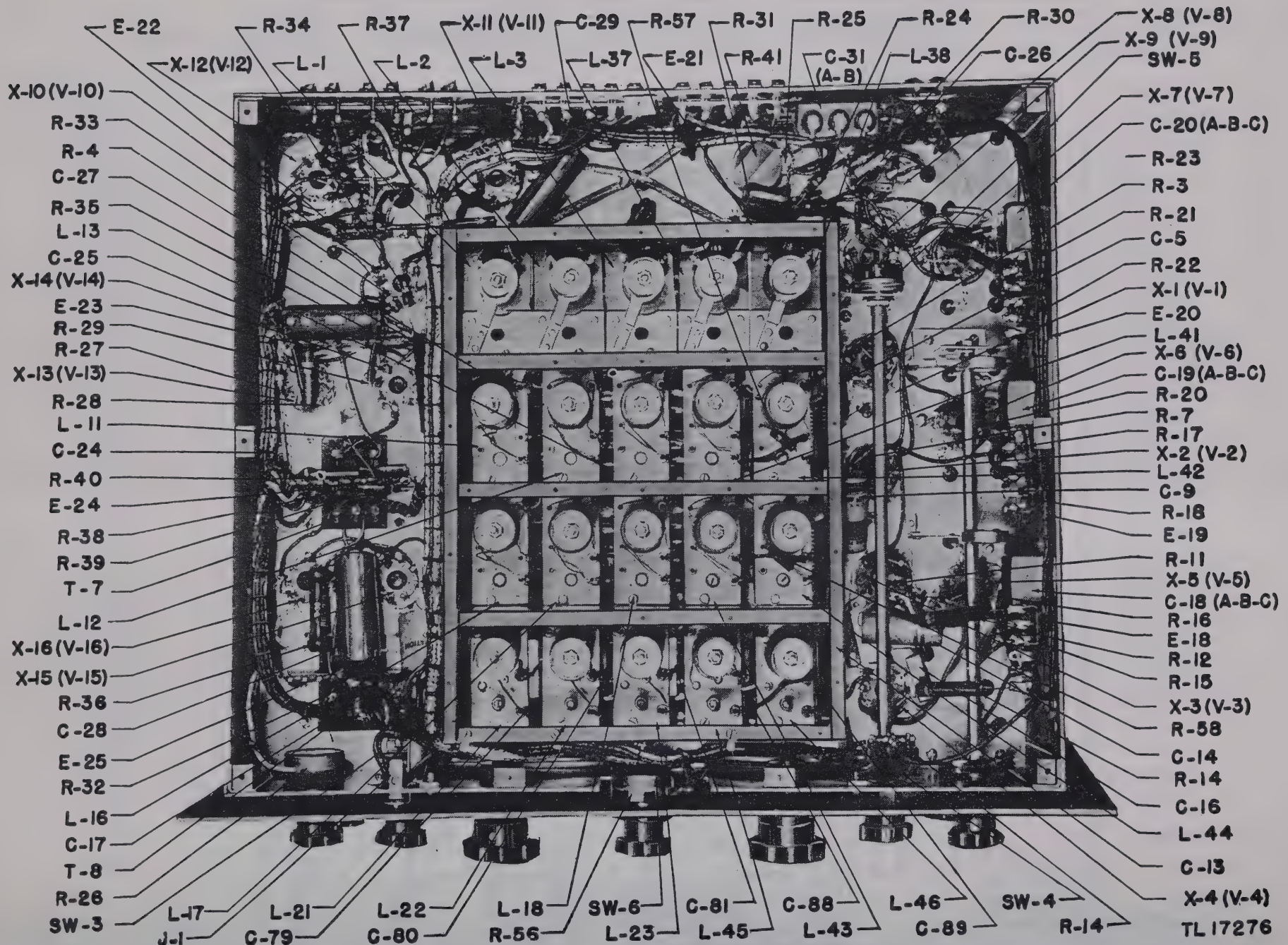


Figure 54. Radio Receiver BC–1004–C, location of parts.

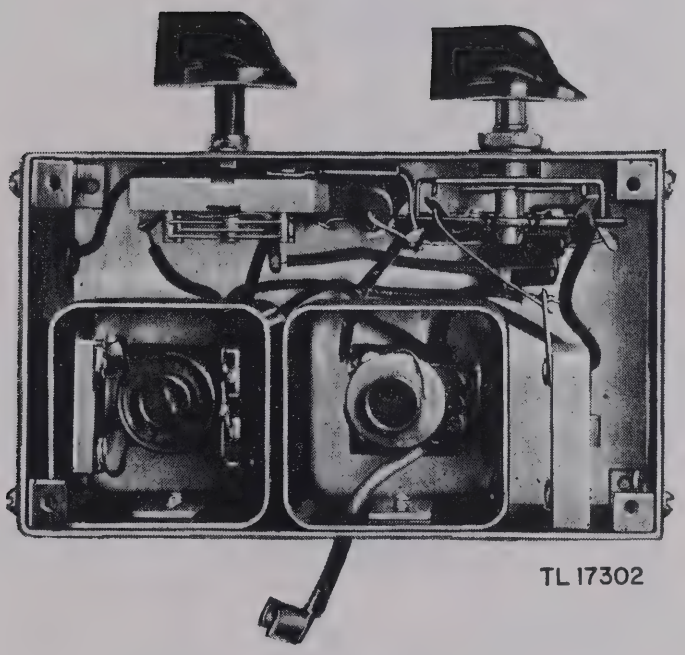
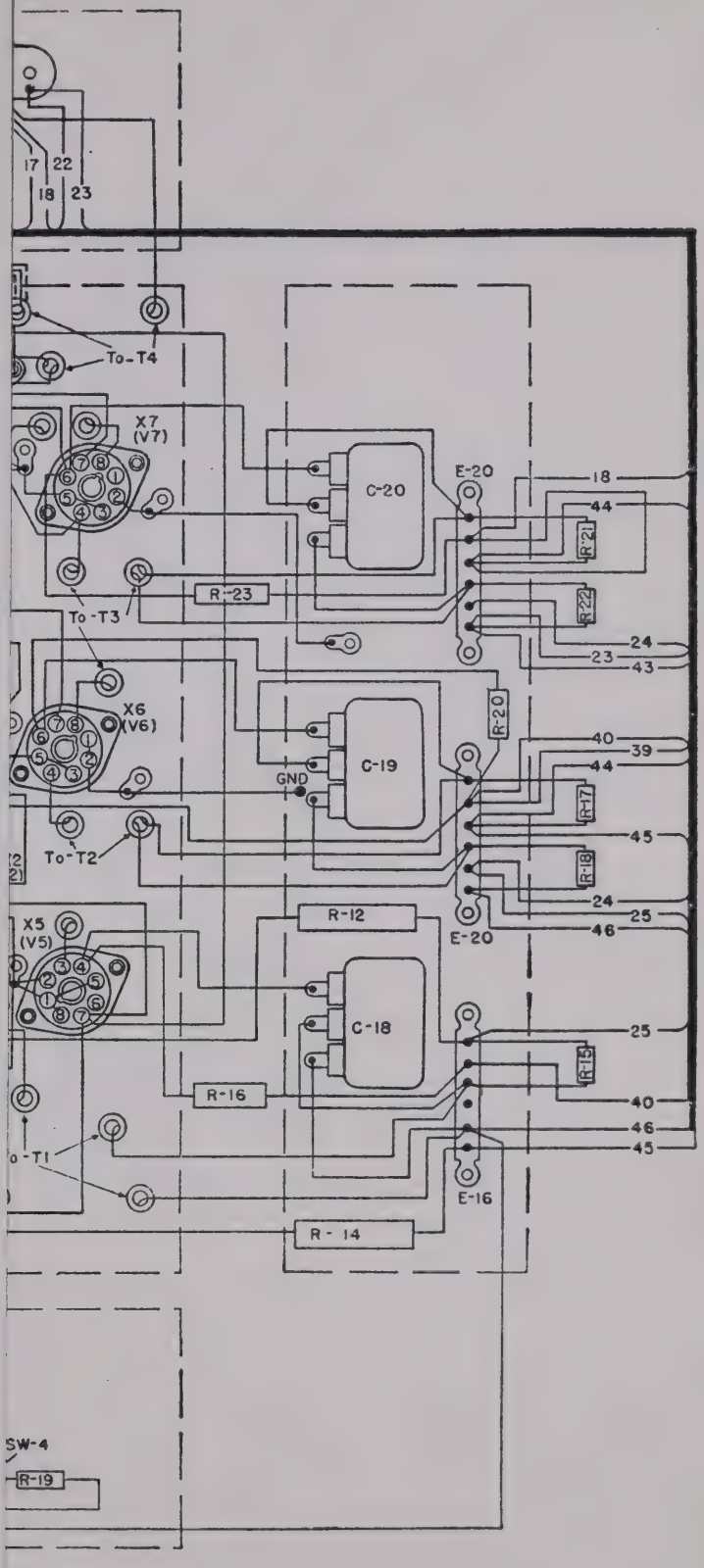


Figure 55. Crystal selectivity unit.


17
22
18
23
To-T4
X7
(V7)
C-20
E-20
18
44
R-21
R-23
R-22
To-T3
24
23
43
X6
(V6)
R-20
C-19
40
39
GND
44
R-17
45
To-T2
R-18
24
25
R-12
46
E-20
X5
(V5)
C-18
25
R-15
R-16
40
46
45
E-16
R-14
SW-4
R-19

TL 17312

n.

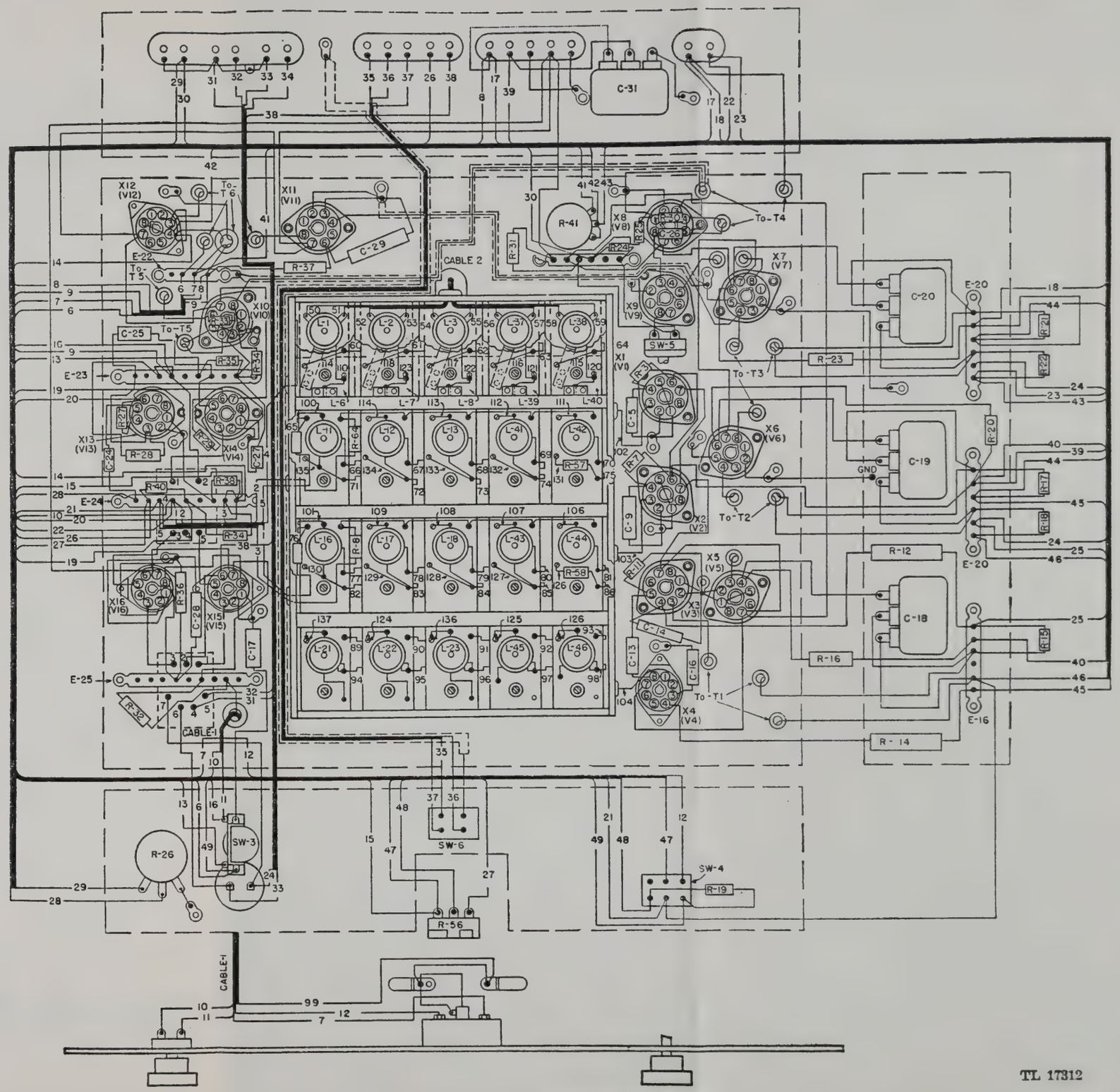
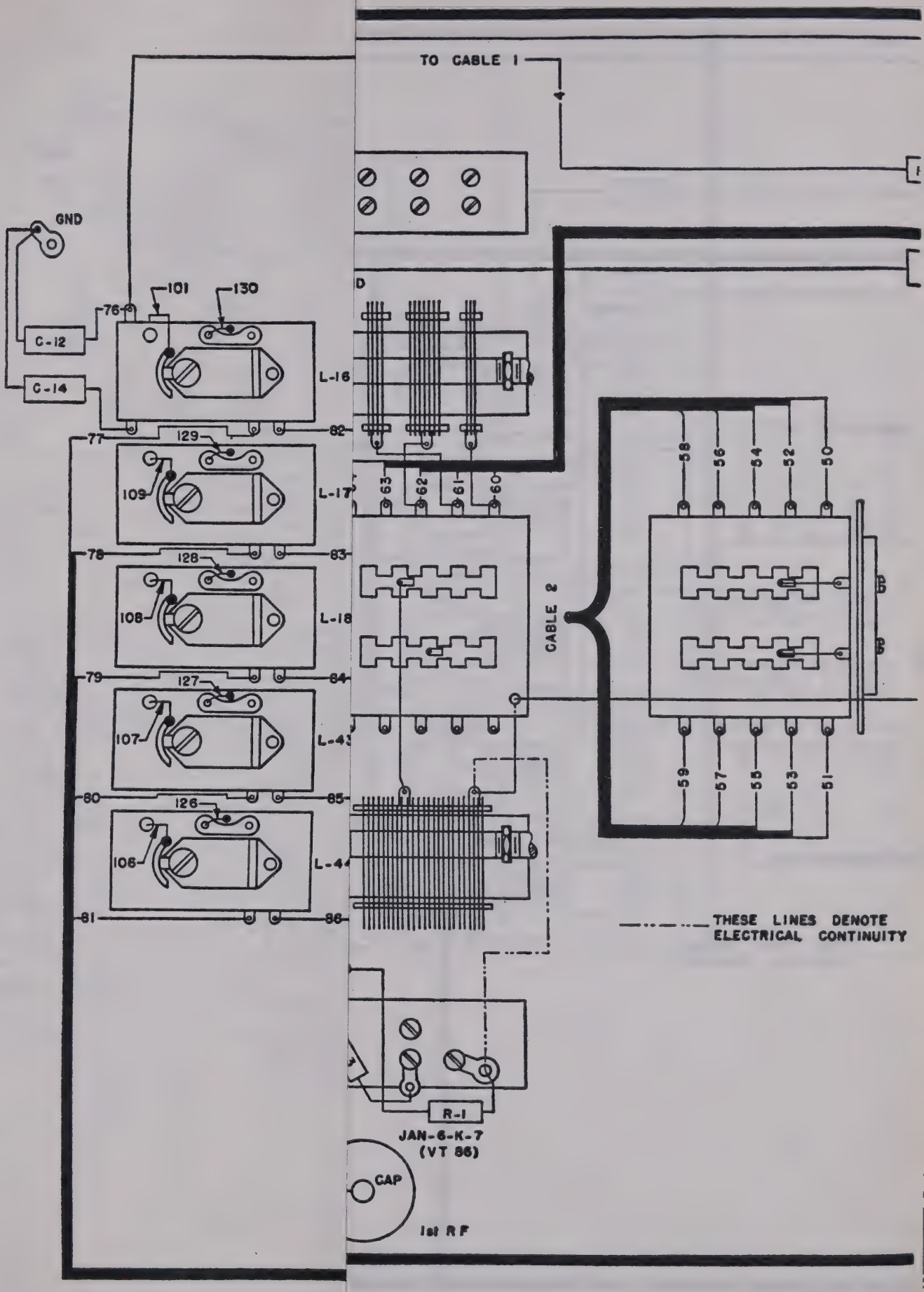
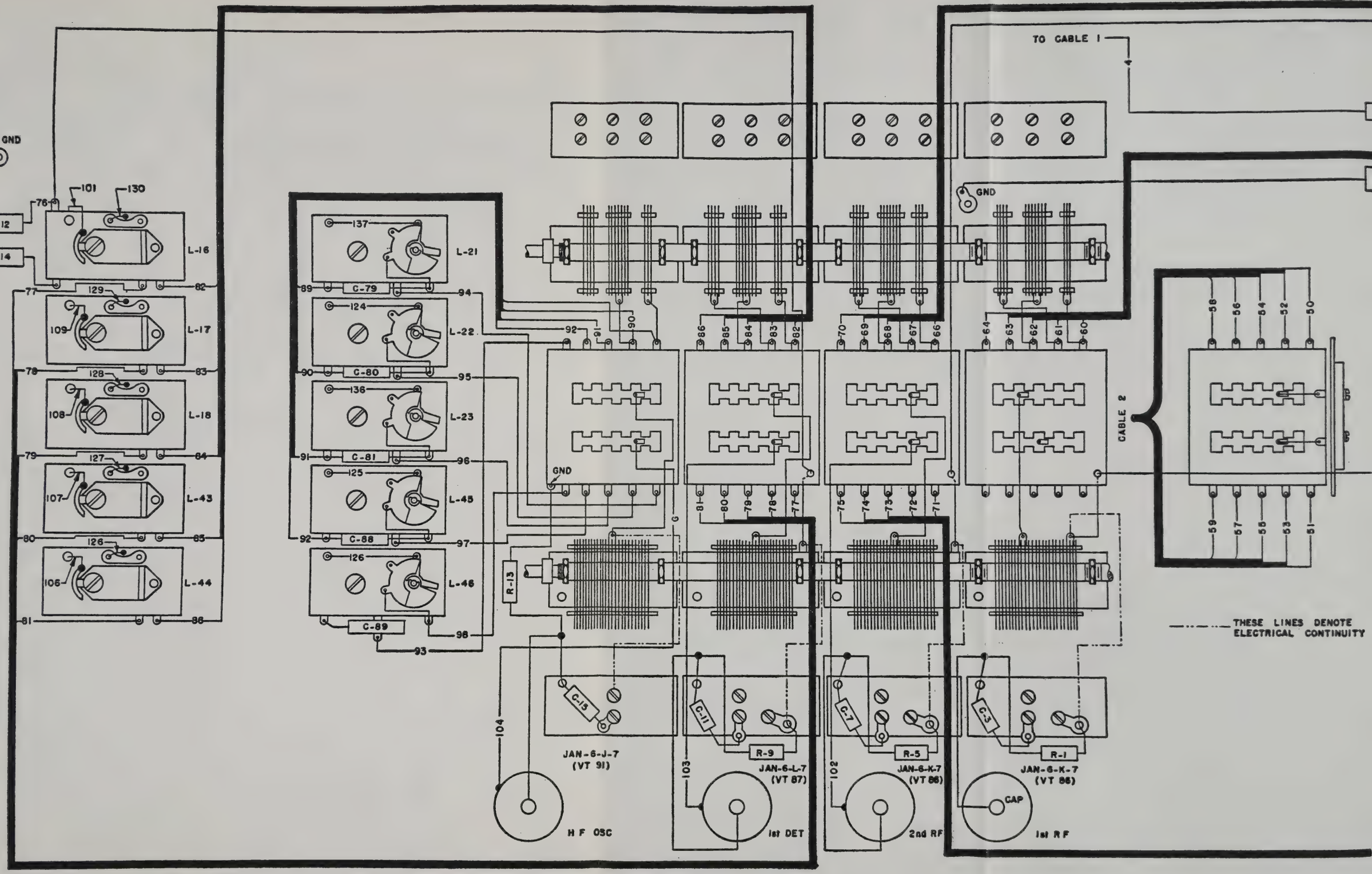


Figure 56. Chasis, pictorial wiring diagram.

TL 17312

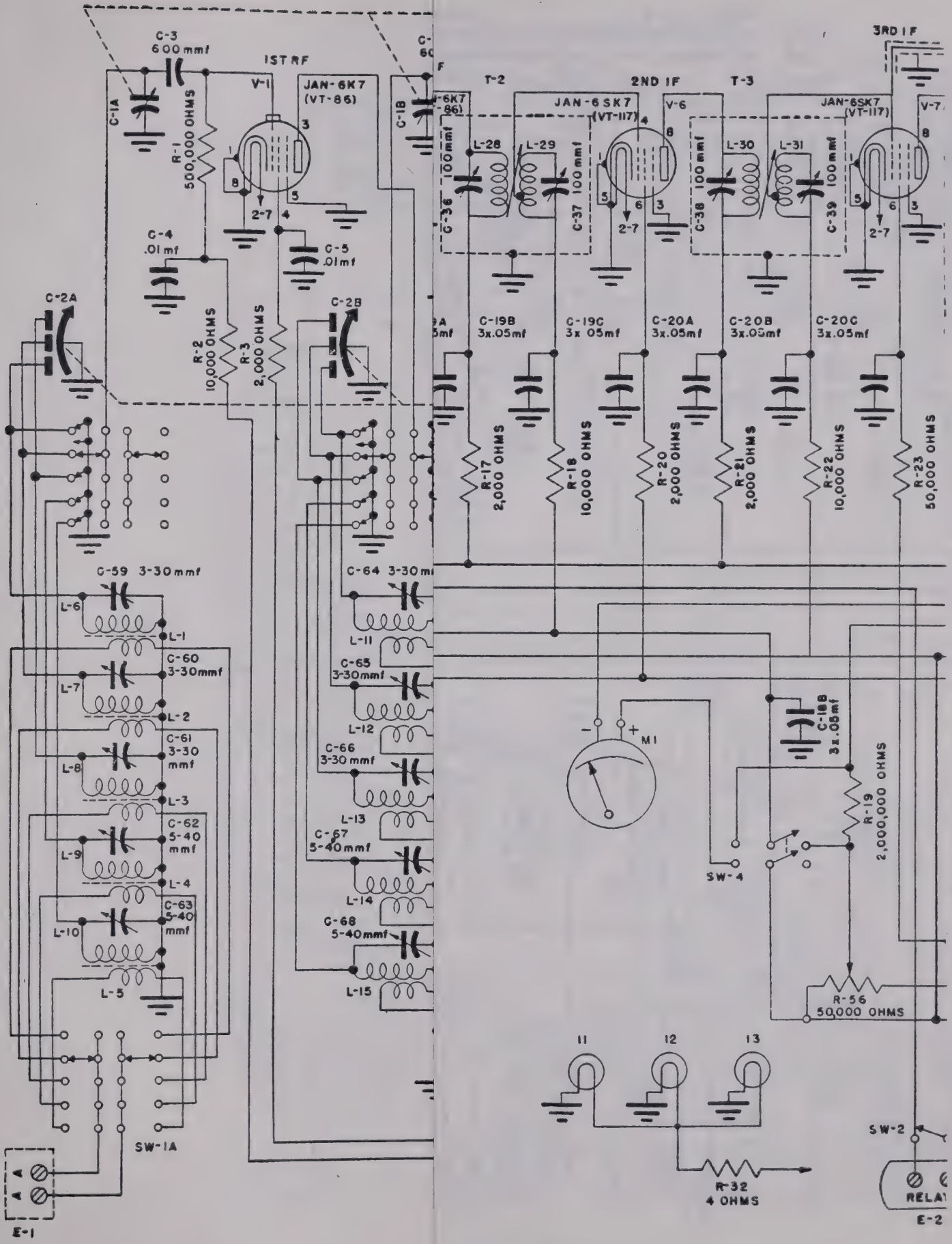

TO CABLE 1
GND
101
130
76
C-12
C-14
L-16
82
77
129
109
L-17
78
83
128
108
L-18
79
84
127
107
80
85
126
106
81
86
63
62
61
60
CABLE 2
58
56
54
52
50
59
57
55
53
51
THESE LINES DENOTE ELECTRICAL CONTINUITY
R-1
JAN-6-K-7
(VT 86)
CAP
1st R F

agram.

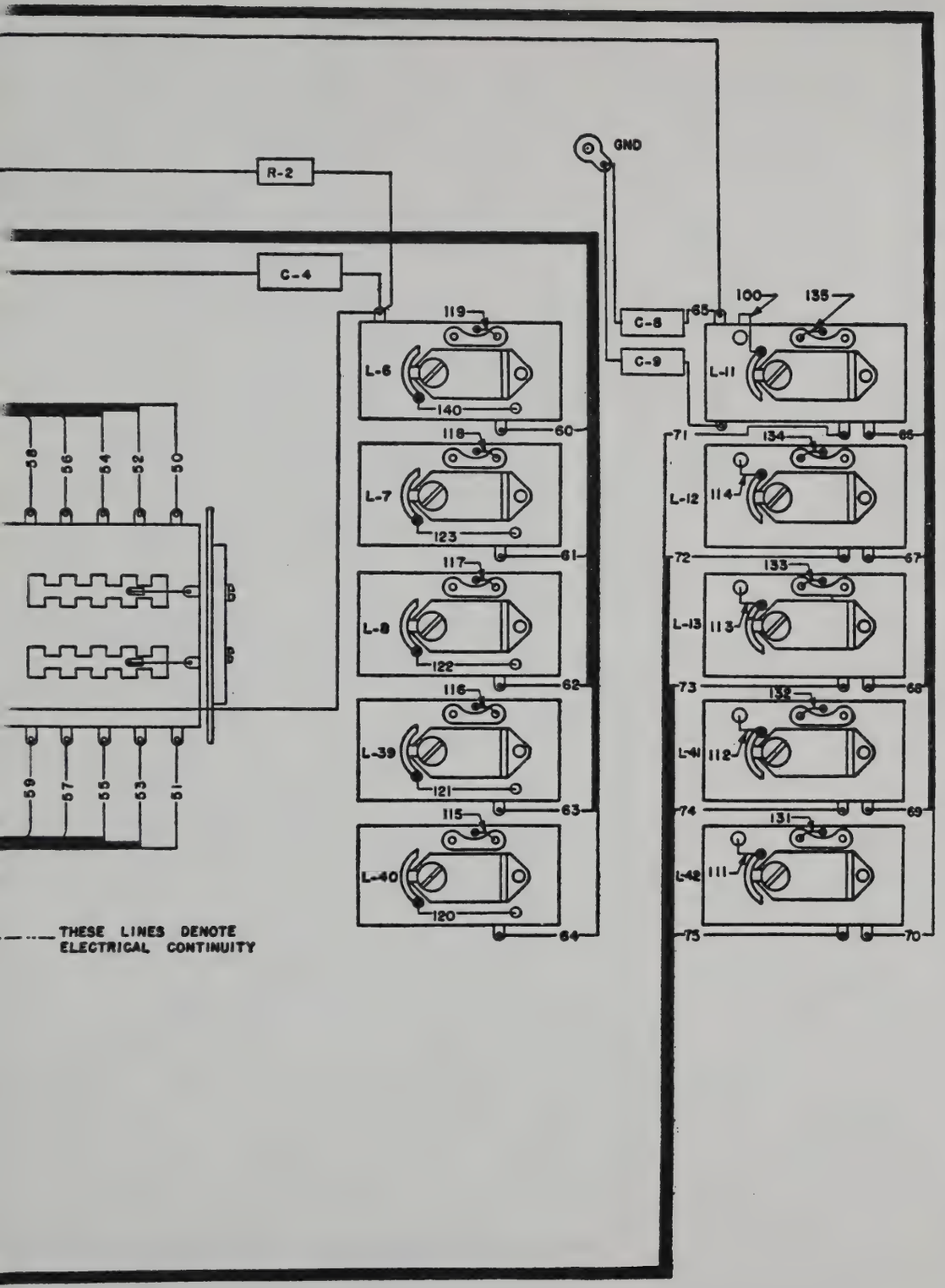


TUNING UNIT

Figure 57. Tuning unit, pictorial wiring diagram.



, schematic diagram.


GND
R-2
C-4
C-8
C-9
L-6
L-7
L-8
L-39
L-40
L-11
L-12
L-13
L-41
L-42
119
118
117
116
115
140
123
122
121
120
100
135
134
133
132
131
114
113
112
111
60
61
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63
64
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55
53
51
THESE LINES DENOTE
ELECTRICAL CONTINUITY

TL 17313

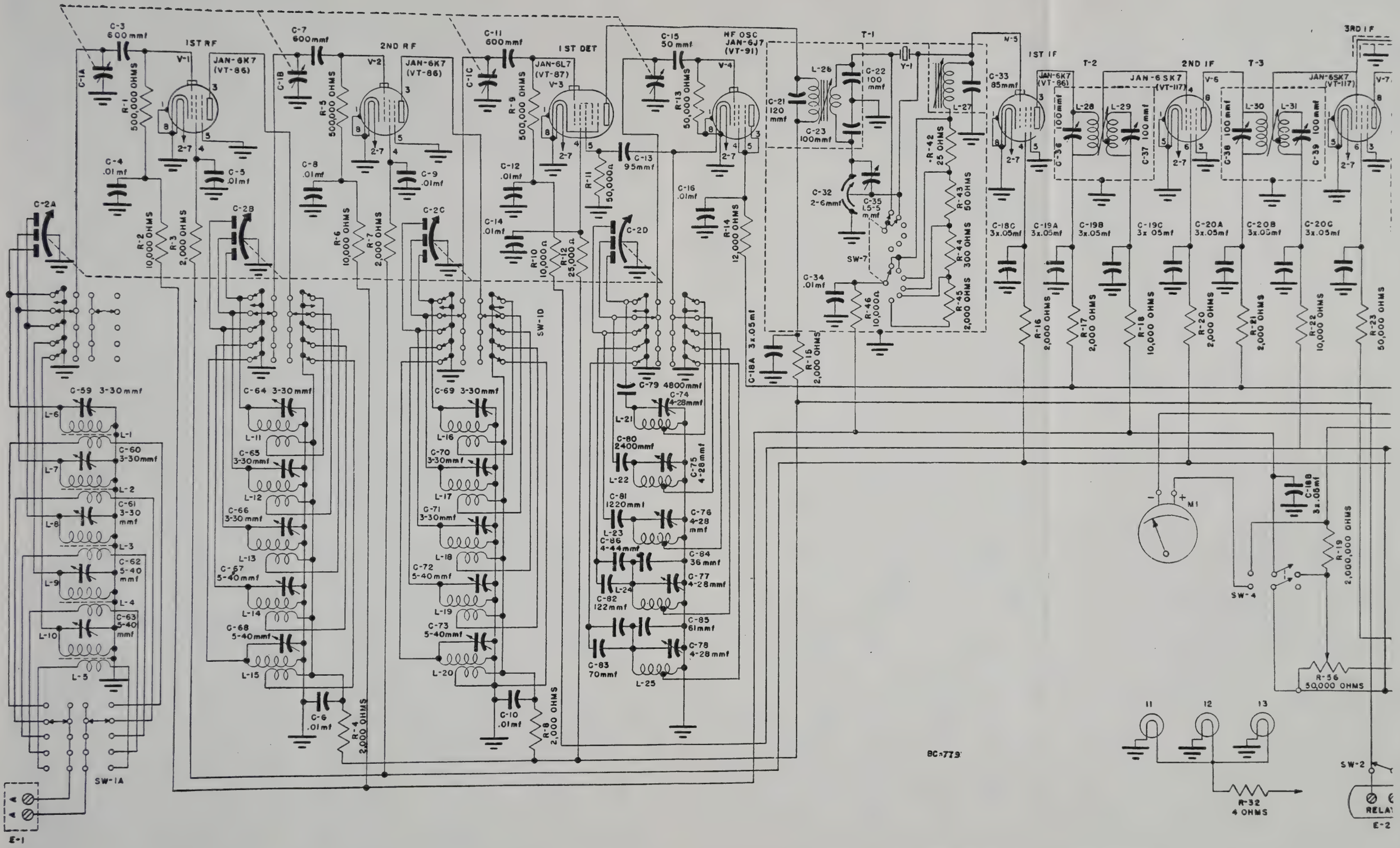
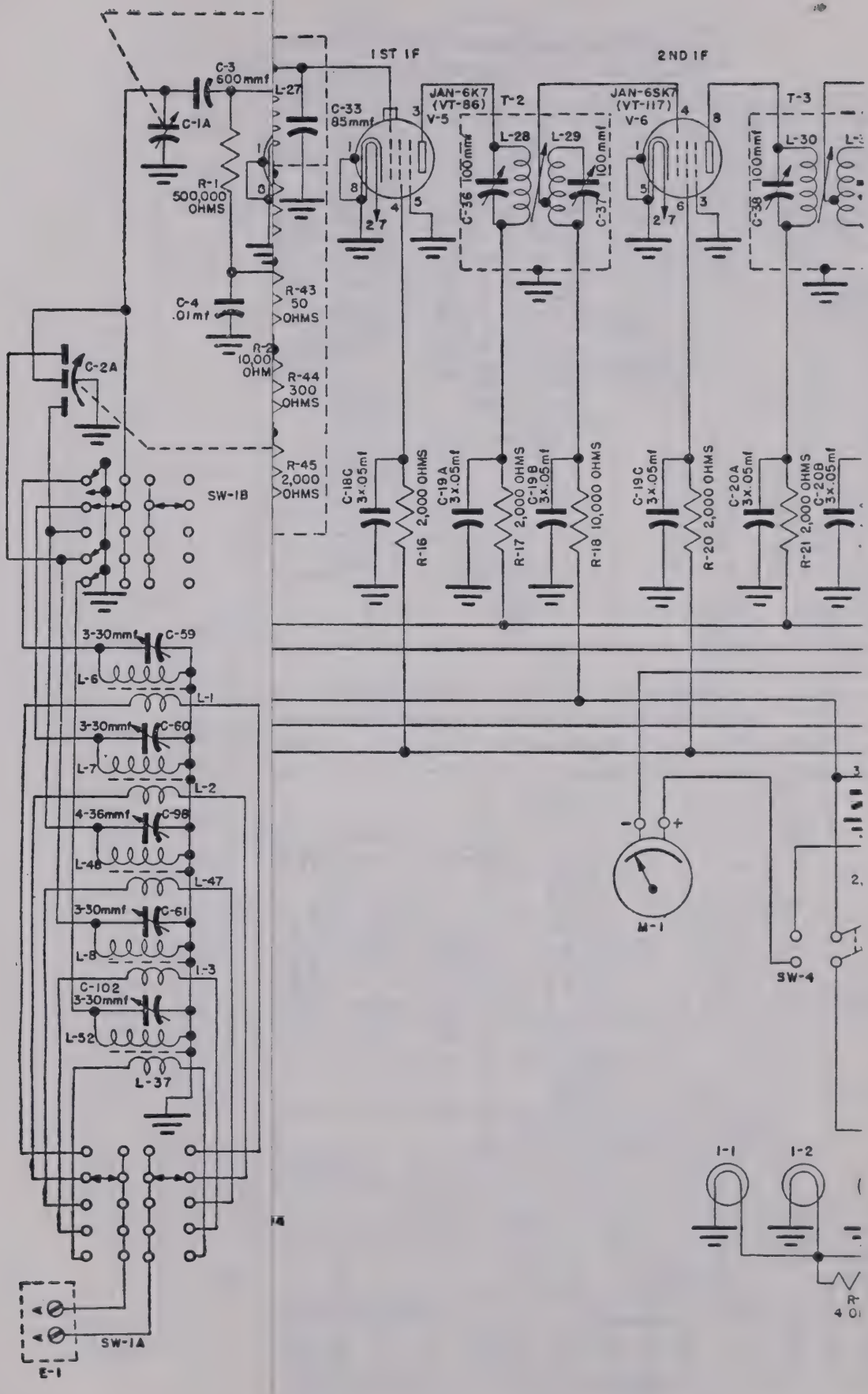
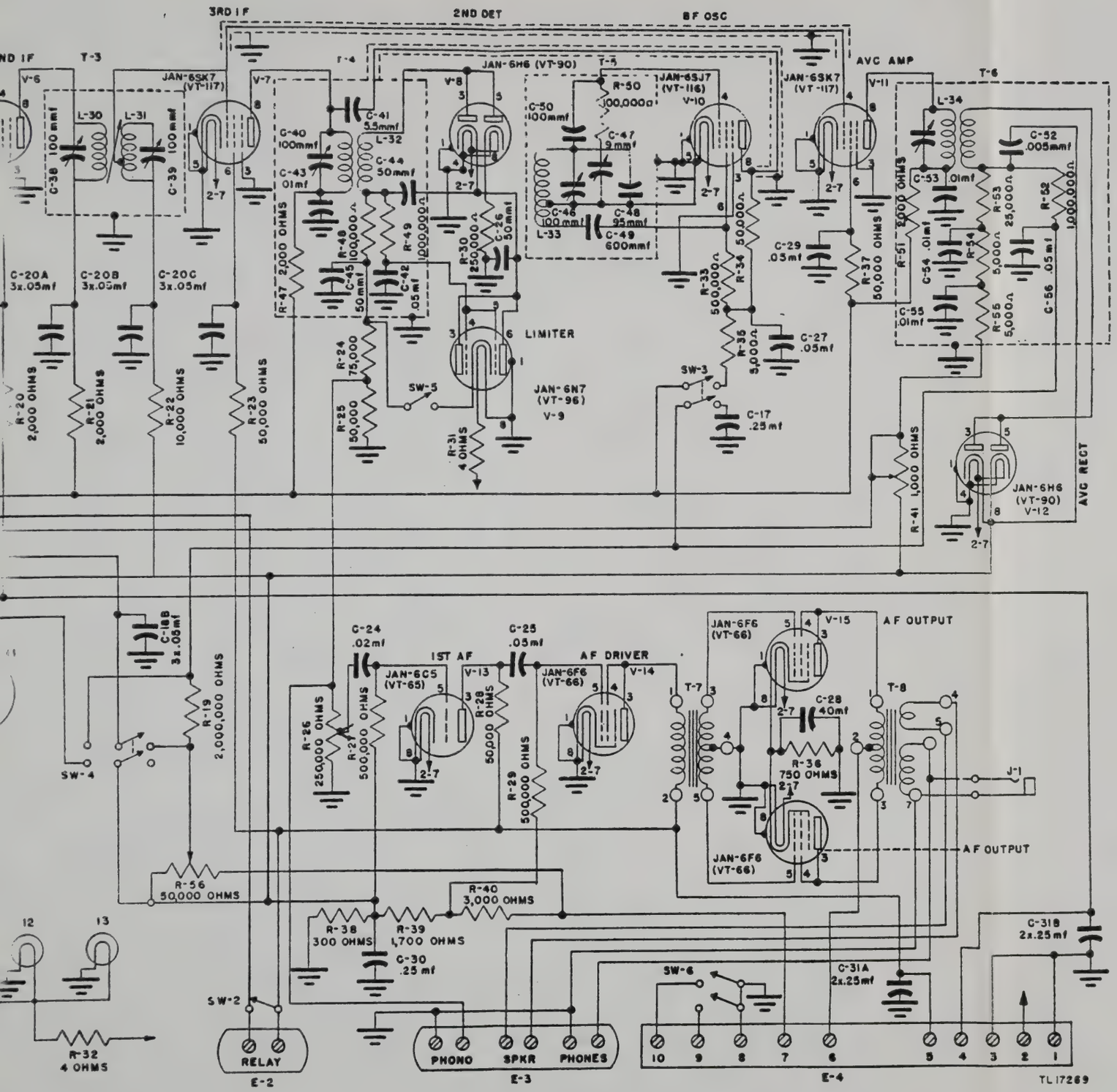


Figure 58. Radio Receiver BC-779-B, schematic diagram.

6
C-52
.005mmf
R-53
25,000Ω
R-52
1,000,000Ω
5,000Ω
.05mf
C-56
R-55
5,000Ω
5
JAN-6H6
(VT-90)
V-12
8
AVG RECT
J-1
UTPUT
C-318
2x.25mf
3
2
1
TL17269



Radio Receiver BC–794–B, schematic diagram.


3RD I F
2ND DET
BF OSC
AVC AMP
T-3
T-4
T-5
T-6
JAN-6SK7 (VT-117)
JAN-6H6 (VT-90)
JAN-6SJ7 (VT-116)
JAN-6N7 (VT-96)
LIMITER
AVC RECT
C-20A 3x.05mf
C-20B 3x.05mf
C-20C 3x.05mf
R-20 2,000 OHMS
R-21 2,000 OHMS
R-22 10,000 OHMS
R-23 50,000 OHMS
SW-5
SW-3
C-17 .25mf
C-27 .05mf
C-29 .05mf
R-37 50,000 OHMS
R-41 1,000 OHMS
R-51 3,000 OHMS
C-52 .005mf
C-53 .01mf
C-54 .01mf
C-55 .01mf
C-56 .05mf
R-52 1,000,000Ω
R-53 25,000Ω
R-54 5,000Ω
R-55 5,000Ω
C-18B 3x.05mf
R-19 2,000,000 OHMS
SW-4
C-24 .02mf
C-25 .05mf
1ST AF
AF DRIVER
JAN-6C5 (VT-65)
JAN-6F6 (VT-66)
R-25 250,000 OHMS
R-27 500,000 OHMS
R-28 50,000 OHMS
R-29 500,000 OHMS
T-7
T-8
C-28 40mf
R-36 750 OHMS
J-1
AF OUTPUT
R-56 50,000 OHMS
R-40 3,000 OHMS
R-38 300 OHMS
R-39 1,700 OHMS
C-30 .25 mf
C-31A 2x.25mf
C-31B 2x.25mf
SW-2
SW-6
R-32 4 OHMS
RELAY
PHONO
SPKR
PHONES
E-2
E-3
E-4
TL 17269

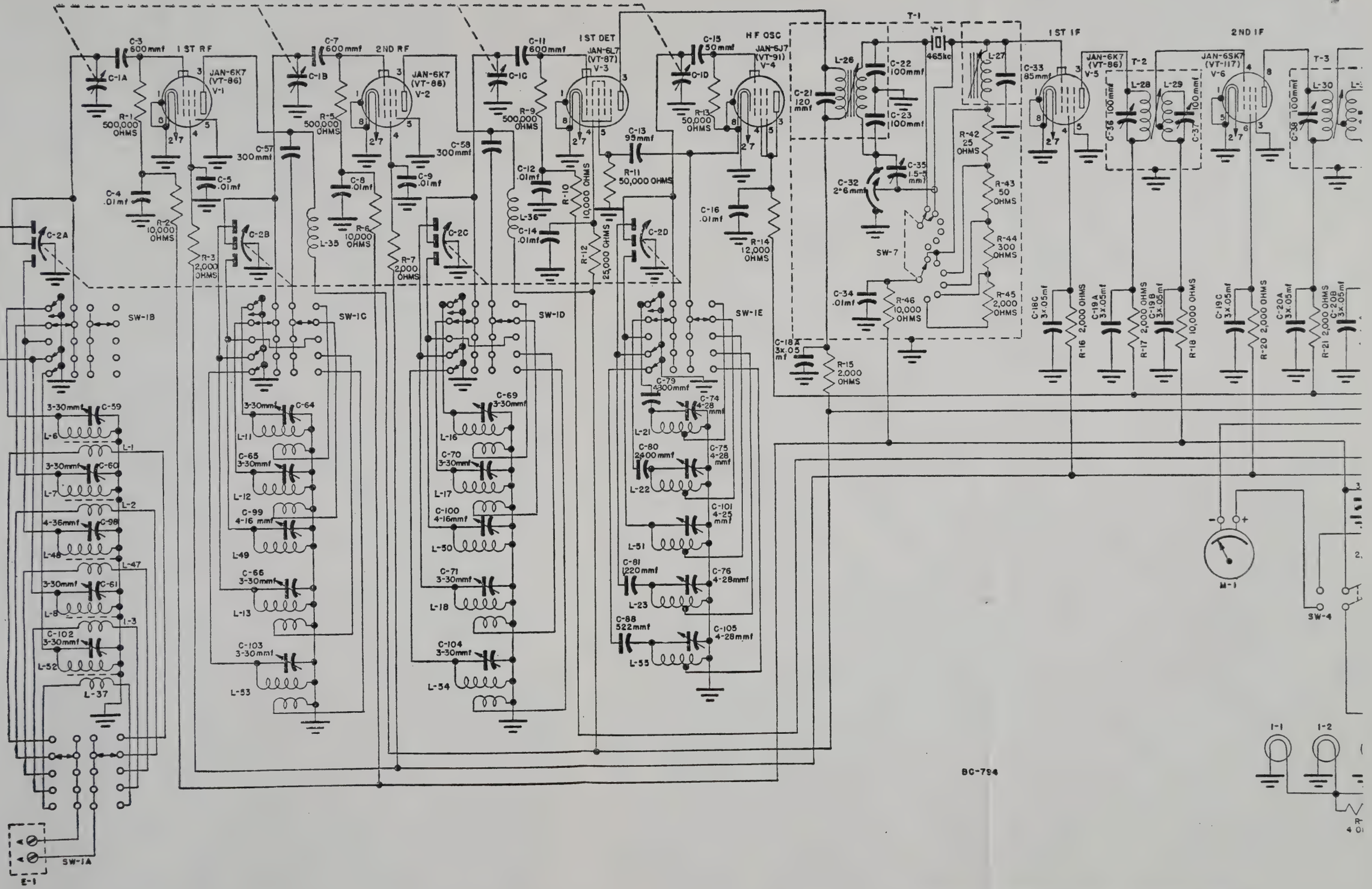
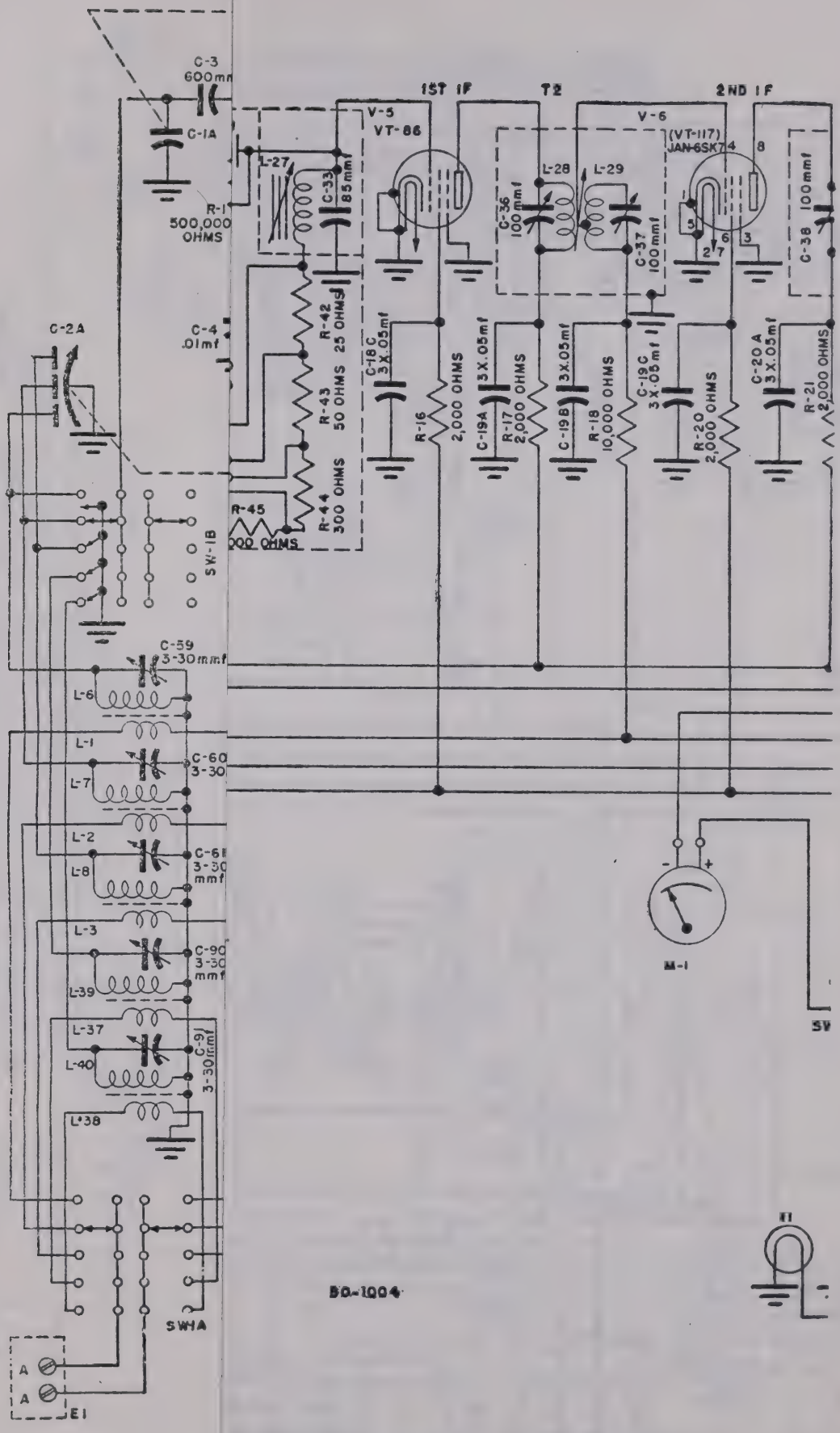
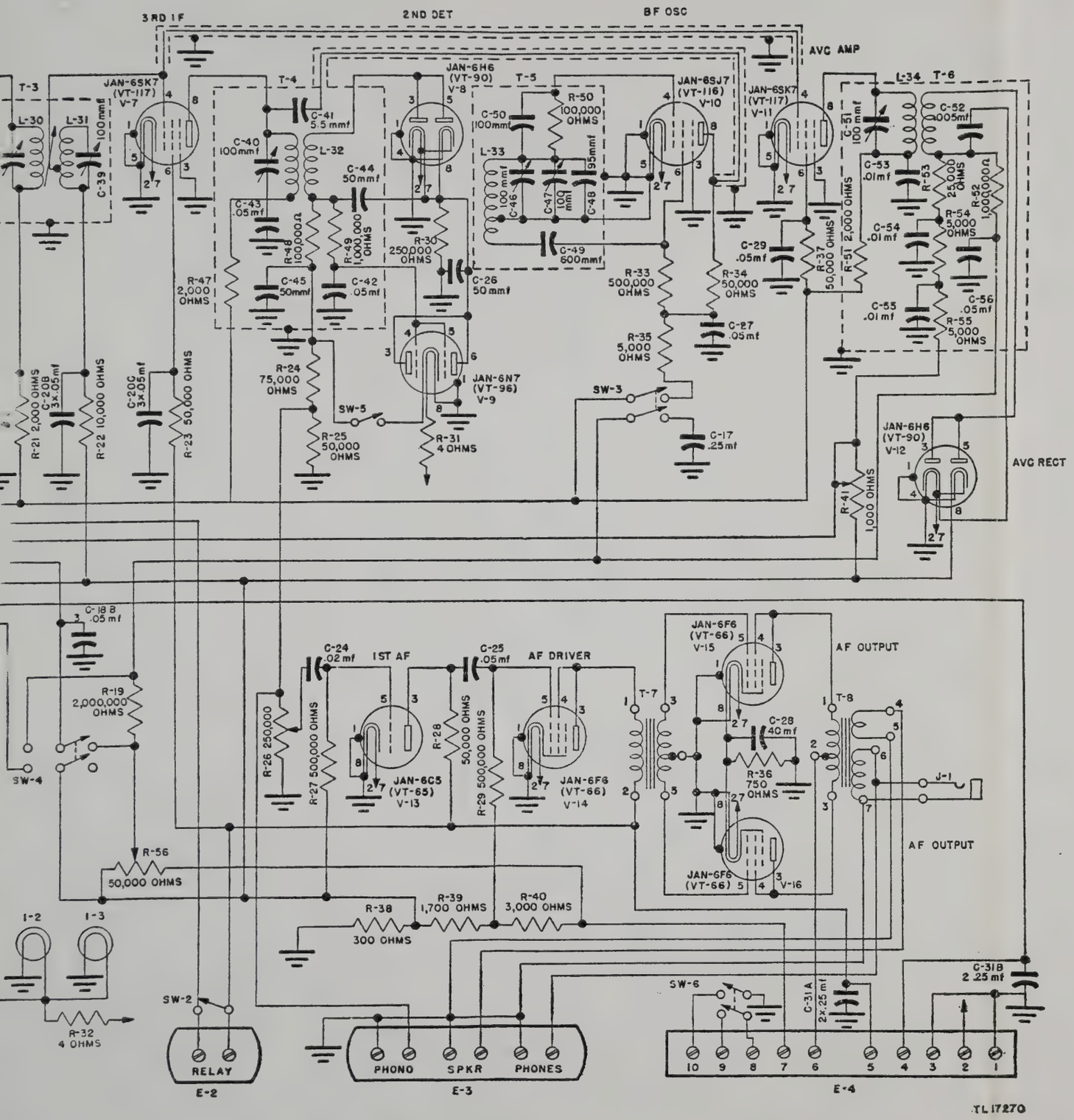


Figure 59. Radio Receiver BC-794-B, schematic diagram.



60. Radio Receiver BC–1004–C, schematic diagram.


3RD IF
2ND DET
BF OSC
AVC AMP
AVC RECT
JAN-6SK7 (VT-117) V-7
JAN-6H6 (VT-90) V-8
JAN-6SJ7 (VT-116) V-10
JAN-6SK7 (VT-117) V-11
JAN-6H6 (VT-90) V-12
JAN-6N7 (VT-96) V-9
JAN-6C5 (VT-65) V-13
JAN-6F6 (VT-66) V-14
JAN-6F6 (VT-66) V-15
JAN-6F6 (VT-66) V-16
T-3
T-4
T-5
T-6
T-7
T-8
L-30
L-31
L-32
L-33
L-34
C-39 100mmf
C-40 100mmf
C-41 5.5 mmf
C-42 .05mf
C-43 .05mf
C-44 50mmf
C-45 50mmf
C-46 100 mmf
C-47 100 mmf
C-48 195mmf
C-49 600mmf
C-50 100mmf
C-51 100 mmf
C-52 .005mf
C-53 .01mf
C-54 .01mf
C-55 .01mf
C-56 .05mf
C-17 .25mf
C-18 B .05mf
C-20C 3x.05mf
C-24 .02mf
C-25 .05mf
C-26 50mmf
C-27 .05mf
C-28 40mf
C-29 .05mf
C-31A 2x.25mf
C-31B 2.25mf
R-19 2,000,000 OHMS
R-21 2,000 OHMS
C-20B 3x.05mf
R-22 10,000 OHMS
R-23 50,000 OHMS
R-24 75,000 OHMS
R-25 50,000 OHMS
R-26 250,000
R-27 500,000 OHMS
R-28 50,000 OHMS
R-29 500,000 OHMS
R-30 250,000 OHMS
R-31 4 OHMS
R-32 4 OHMS
R-33 500,000 OHMS
R-34 50,000 OHMS
R-35 5,000 OHMS
R-36 750 OHMS
R-37 50,000 OHMS
R-38 300 OHMS
R-39 1,700 OHMS
R-40 3,000 OHMS
R-41 1,000 OHMS
R-45 100,000Ω
R-47 2,000 OHMS
R-48 100,000Ω
R-49 1,000,000 OHMS
R-50 100,000 OHMS
R-51 2,000 OHMS
R-52 1,000,000Ω
R-53 25,000 OHMS
R-54 5,000 OHMS
R-55 5,000 OHMS
R-56 50,000 OHMS
SW-2
SW-3
SW-4
SW-5
SW-6
I-1
I-2
I-3
J-1
RELAY
E-2
PHONO
SPKR
PHONES
E-3
E-4
10 9 8 7 6 5 4 3 2 1
TL 17270

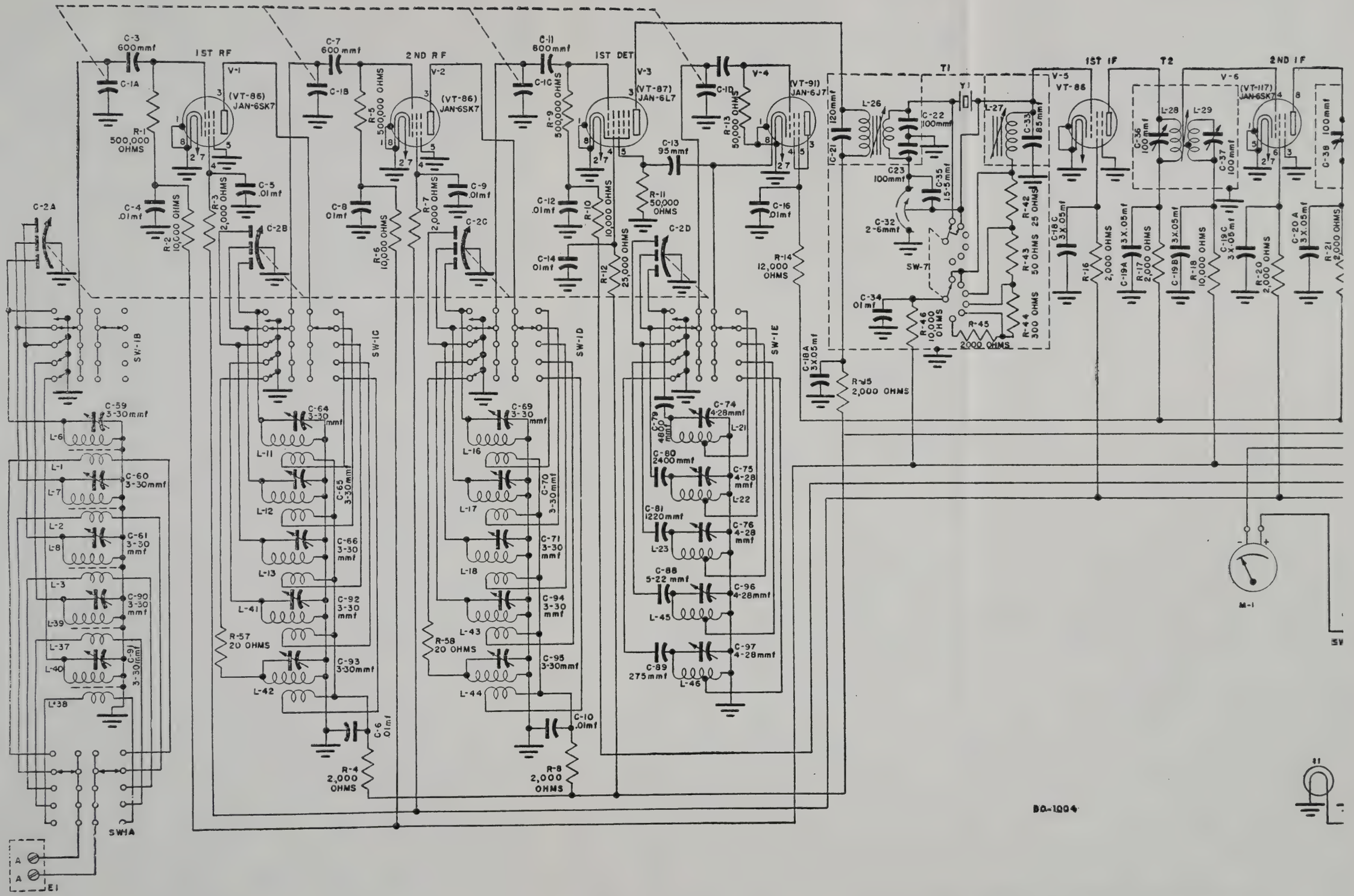
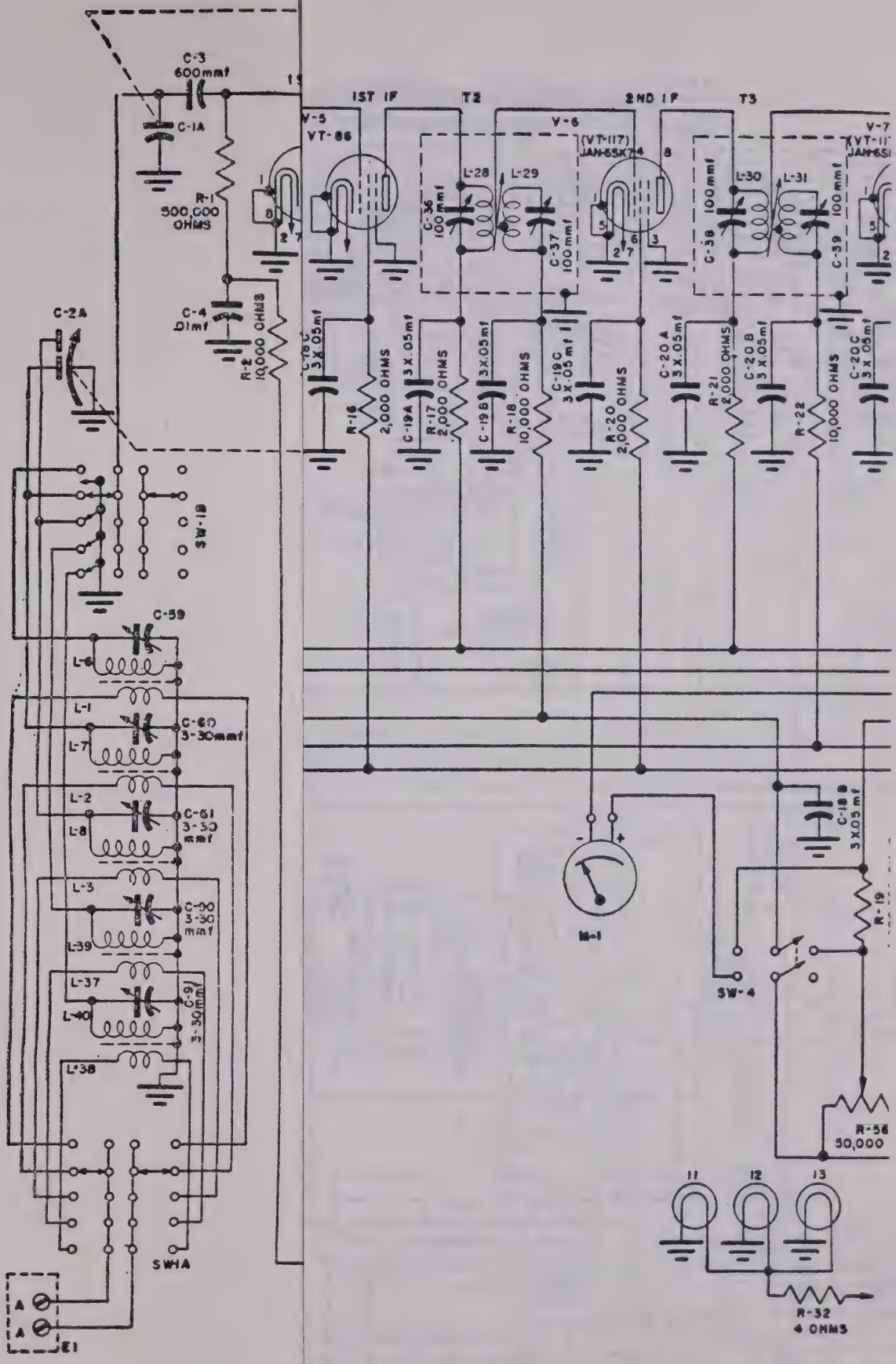
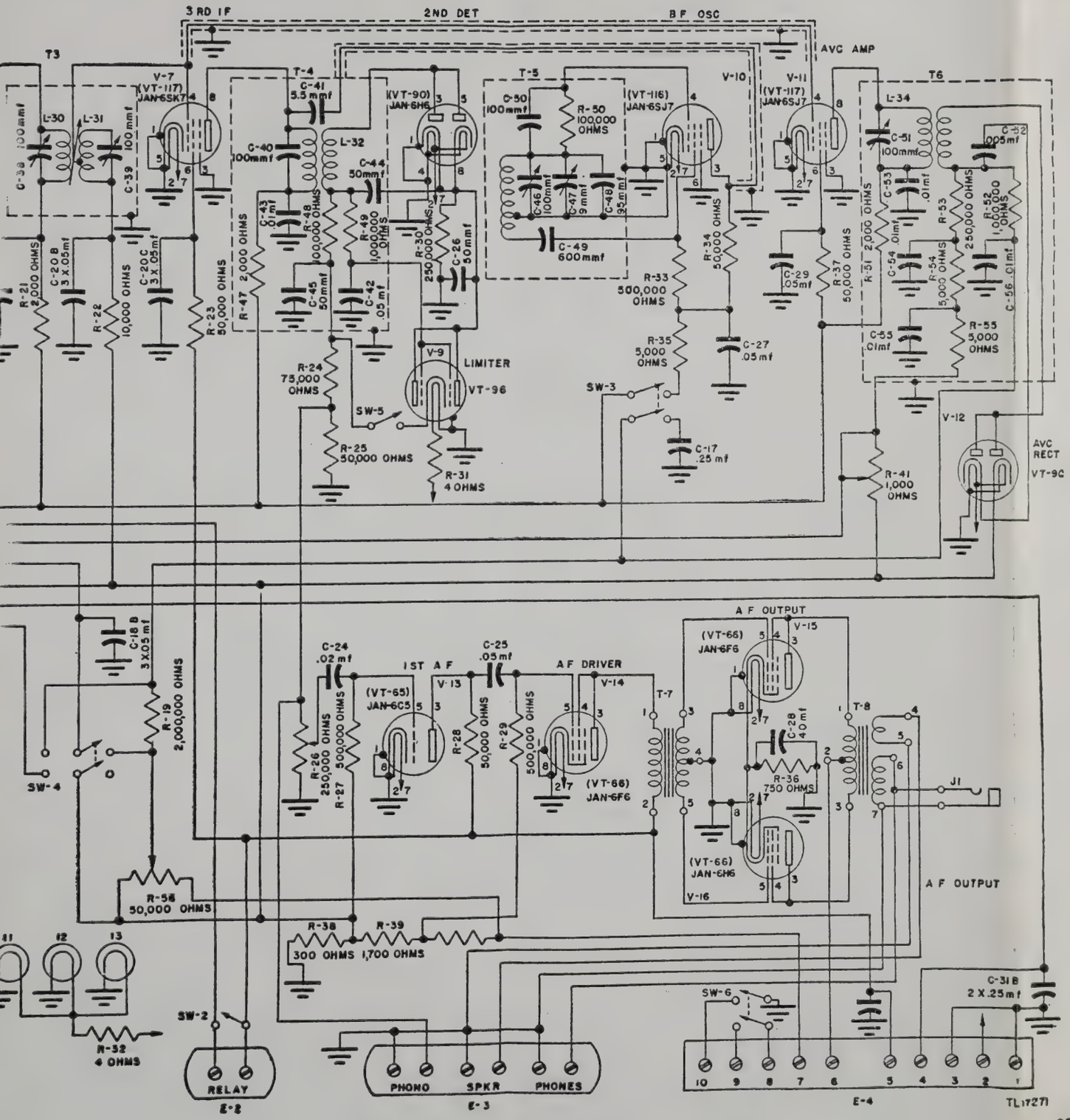


Figure 60. Radio Receiver BC–1004–C, schematic diagram.



eiver R–129/U, schematic diagram.


3RD IF
2ND DET
B F OSC
AVC AMP
T3
T4
T5
T6
V-7 (VT-117) JAN-6SK7
(VT-90) JAN-6H6
V-10
(VT-116) JAN-6SJ7
V-11 (VT-117) JAN-6SJ7
L-30
L-31
L-32
L-34
C-38 100mmf
C-39 100mmf
C-40 100mmf
C-41 5.5 mmf
C-44 50mmf
C-50 100mmf
R-50 100,000 OHMS
C-46 100mmf
C-47 9 mmf
C-48 35 mmf
C-49 600mmf
C-51 100mmf
C-52 .005mf
C-53 .01mf
R-21 2,000 OHMS
C-20B 3 X.05mf
C-20C 3 X.05mf
R-22 10,000 OHMS
R-23 50,000 OHMS
R-47 2,000 OHMS
C-43 .01mf
R-48 100,000 OHMS
R-49 1,000,000 OHMS
R-30 250,000 OHMS
C-26 50mmf
C-45 50mf
C-42 .05 mf
R-33 500,000 OHMS
R-34 50,000 OHMS
C-29 .05mf
R-37 50,000 OHMS
R-51 2,000 OHMS
C-54 .01mf
R-54 5,000 OHMS
R-53 250,000 OHMS
R-52 1,000,000 OHMS
C-56 .01mf
C-55 .01mf
R-55 5,000 OHMS
R-24 75,000 OHMS
V-9 LIMITER VT-96
SW-5
R-25 50,000 OHMS
R-31 4 OHMS
R-35 5,000 OHMS
C-27 .05mf
SW-3
C-17 .25 mf
V-12
AVC RECT VT-90
R-41 1,000 OHMS
C-18B 3X.05 mf
R-19 2,000,000 OHMS
SW-4
C-24 .02 mf
1ST A F
V-13
C-25 .05 mf
A F DRIVER
V-14
A F OUTPUT
(VT-66) JAN-6F6
V-15
T-7
T-8
R-26 250,000 OHMS
R-27 500,000 OHMS
(VT-65) JAN-6C5
R-28 50,000 OHMS
R-29 500,000 OHMS
C-28 40 mf
R-36 750 OHMS
J1
(VT-66) JAN-6H6
V-16
A F OUTPUT
R-56 50,000 OHMS
R-38 300 OHMS
R-39 1,700 OHMS
C-31B 2 X.25mf
SW-6
SW-2
R-32 4 OHMS
RELAY
E-2
PHONO
SPKR
PHONES
E-3
E-4
TL17271

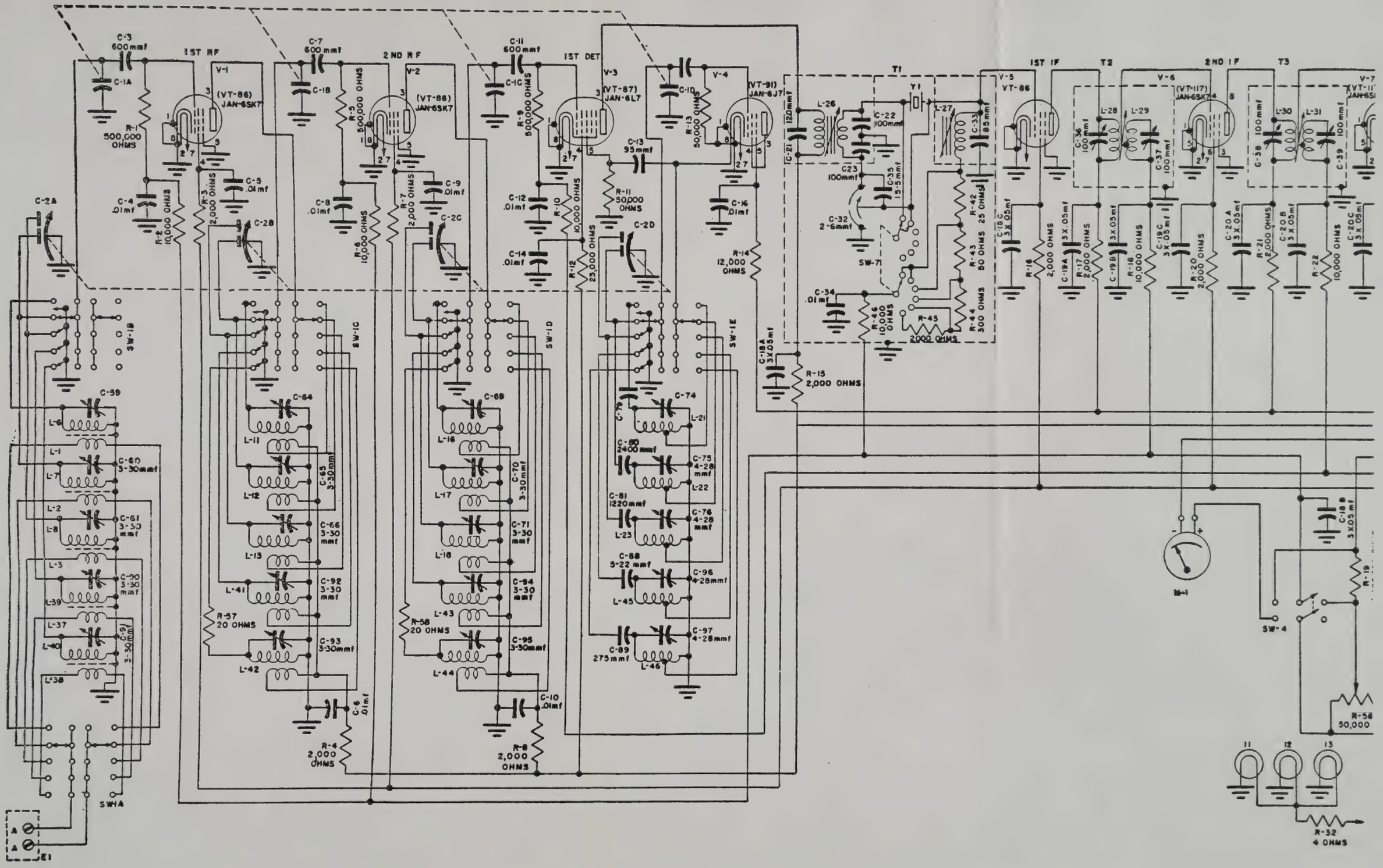
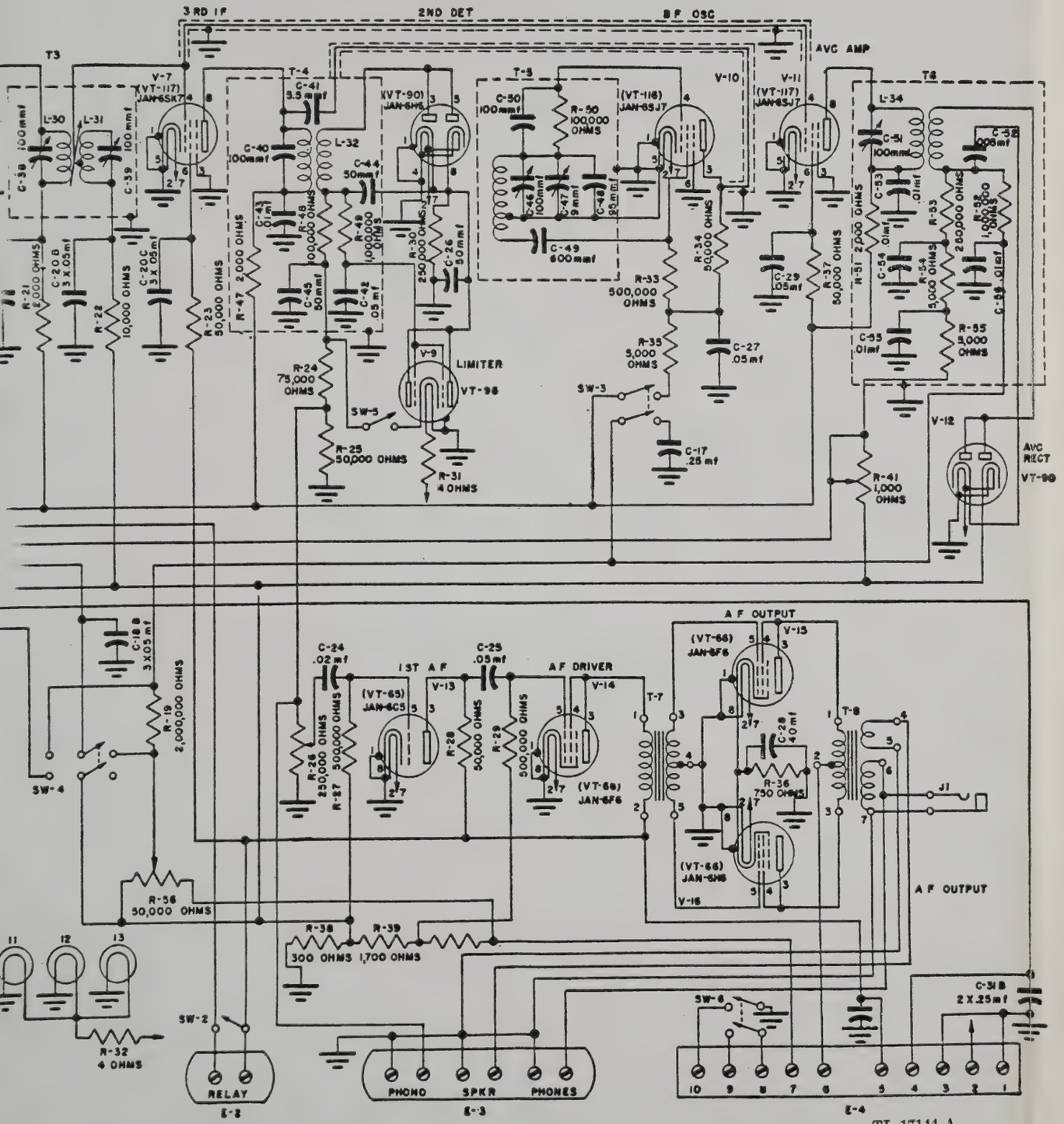
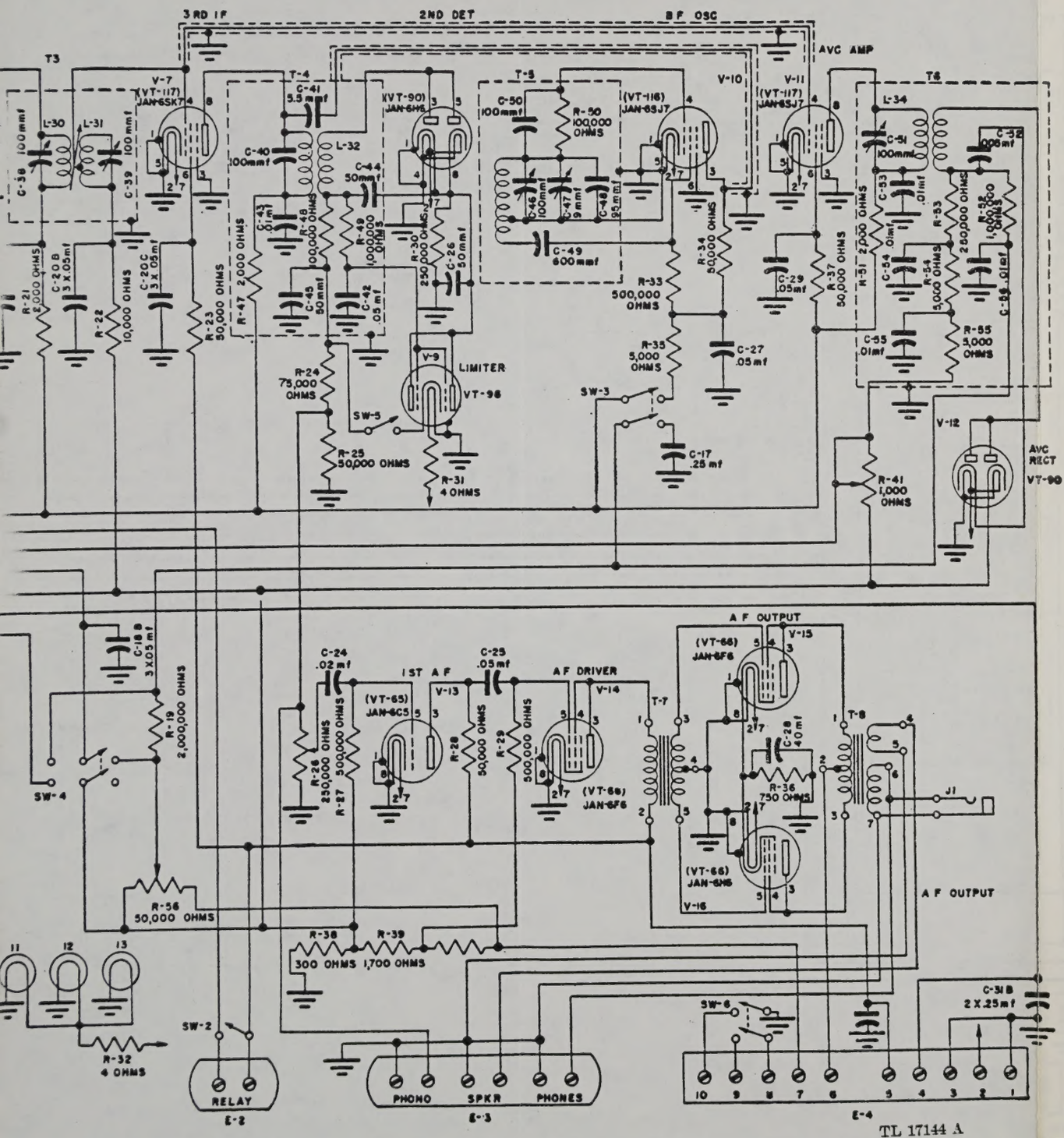


Figure 61. Radio Receiver R-129/U, schematic diagram.


3RD IF
2ND DET
BF OSC
AVC AMP
T3
T4
T5
T6
V-7 (VT-117) JAN-6SK7
V-9 LIMITER VT-98
V-10 (VT-116) JAN-6SJ7
V-11 (VT-117) JAN-6SJ7
V-12 AVC RECT VT-99
L-30
L-31
L-32
L-34
C-38 100mmf
C-39 100mmf
C-40 100mmf
C-41 3.5 mmf
C-44 50mmf
C-50 100mmf
C-46 100mmf
C-47 9 mmf
C-48 95 mf
C-49 600 mmf
C-51 100mmf
C-53 .01mf
C-54 .01mf
C-55 .01mf
C-56 .005mf
C-58 .01mf
C-29 .05mf
C-27 .05mf
C-17 .25 mf
R-21 2,000 OHMS
C-20B 3 X .05mf
R-22 10,000 OHMS
C-20C 3 X .05mf
R-23 50,000 OHMS
R-47 2,000 OHMS
R-48 100,000 OHMS
R-49 1,000,000 OHMS
R-30 250,000 OHMS
C-26 50mmf
C-43 .01mf
C-45 50mmf
C-42 .05 mf
R-24 75,000 OHMS
R-25 50,000 OHMS
R-31 4 OHMS
SW-5
SW-3
R-50 100,000 OHMS
R-33 500,000 OHMS
R-34 50,000 OHMS
R-35 5,000 OHMS
R-37 50,000 OHMS
R-51 2,000 OHMS
R-53 260,000 OHMS
R-54 5,000 OHMS
R-55 5,000 OHMS
R-58 1,000,000 OHMS
R-41 1,000 OHMS
C-18B 3 X .05 mf
R-19 2,000,000 OHMS
SW-4
C-24 .02 mf
C-25 .05mf
1ST A F
A F DRIVER
(VT-65) JAN-6C5
(VT-66) JAN-6F6
V-13
V-14
V-15
V-16
R-26 250,000 OHMS
R-27 500,000 OHMS
R-28 50,000 OHMS
R-29 500,000 OHMS
T-7
T-8
C-28 40 mf
R-36 750 OHMS
J1
A F OUTPUT
R-56 50,000 OHMS
R-38 300 OHMS
R-39 1,700 OHMS
C-31B 2 X .25mf
SW-6
SW-2
R-32 4 OHMS
RELAY
PHONO
SPKR
PHONES
E-2
E-3
E-4
11
12
13
10
9
8
7
6
5
4
3
2
1

TL 17144 A


3RD IF
2ND DET
BF OSC
AVC AMP
T3
T4
T5
T6
V-7 (VT-117) JAN-6SK7
V-9 LIMITER VT-98
(VT-901) JAN-6H6
V-10 (VT-116) JAN-6SJ7
V-11 (VT-117) JAN-6SJ7
V-12 AVC RECT VT-90
L-30
L-31
L-32
L-34
C-36 100mmf
C-39 100mmf
C-41 5.5 mmf
C-40 100mmf
C-44 50mmf
C-43 .01mf
C-45 50mmf
C-42 .05 mf
C-26 50mmf
C-50 100mmf
C-46 100mmf
C-47 9 mmf
C-48 82 mmf
C-49 600mmf
C-29 .05mf
C-51 100mmf
C-52 .05mf
C-53 .01mf
C-54 .01mf
C-55 .01mf
C-56 .01mf
R-21 2,000 OHMS
C-20B 3 X .05mf
R-22 10,000 OHMS
C-20C 3 X .05mf
R-23 50,000 OHMS
R-47 2,000 OHMS
R-48 100,000 OHMS
R-49 100,000 OHMS
R-30 250,000 OHMS
R-24 75,000 OHMS
R-25 50,000 OHMS
R-31 4 OHMS
SW-5
R-50 100,000 OHMS
R-33 500,000 OHMS
R-35 5,000 OHMS
C-27 .05mf
SW-3
C-17 .25 mf
R-34 50,000 OHMS
R-37 50,000 OHMS
R-51 2,000 OHMS
R-53 280,000 OHMS
R-54 5,000 OHMS
R-55 5,000 OHMS
R-52 1,000,000 OHMS
R-41 1,000 OHMS
A F OUTPUT
(VT-66) JAN-6F6
V-13
V-14
V-15
V-16
1ST A F
AF DRIVER
(VT-65) JAN-6C5
T-7
T-8
J1
C-24 .02 mf
C-25 .05mf
C-28 40 mf
R-26 250,000 OHMS
R-27 500,000 OHMS
R-28 50,000 OHMS
R-29 500,000 OHMS
R-36 750 OHMS
C-18B 3 X .05 mf
R-19 2,000,000 OHMS
SW-4
R-56 50,000 OHMS
R-38 300 OHMS
R-39 1,700 OHMS
R-32 4 OHMS
SW-2
RELAY
E-2
PHONO
SPKR
PHONES
E-3
SW-6
C-31B 2 X .25 mf
E-4
11
12
13
10
9
8
7
6
5
4
3
2
1

TL 17144 A